EATON | Cutler-Hammer

# O & M Manual for the CHGEN Automatic Transfer Switch

Instruction Booklet

New Information


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## ⚠ WARNING

**READ AND UNDERSTAND THE INSTRUCTIONS CONTAINED HEREINAFTER BEFORE ATTEMPTING TO UNPACK, ASSEMBLE, OPERATE, OR MAINTAIN THIS EQUIPMENT.**

**HAZARDOUS VOLTAGES ARE PRESENT INSIDE TRANSFER SWITCH ENCLOSURES THAT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. FOLLOW PROPER INSTALLATION, OPERATION, AND MAINTENANCE PROCEDURES TO AVOID THESE VOLTAGES.**

**THE TRANSFER SWITCH EQUIPMENT COVERED BY THIS INSTRUCTION BOOK IS DESIGNED AND TESTED TO OPERATE WITHIN ITS NAMEPLATE RATINGS. OPERATION OUTSIDE OF THESE RATINGS MAY CAUSE THE EQUIPMENT TO FAIL RESULTING IN DEATH, SERIOUS BODILY INJURY, AND/OR PROPERTY DAMAGE. ALL RESPONSIBLE PERSONNEL SHOULD LOCATE THE DOOR MOUNTED EQUIPMENT NAMEPLATE AND BE FAMILIAR WITH THE INFORMATION PROVIDED ON THE NAMEPLATE. A TYPICAL EQUIPMENT NAMEPLATE IS SHOWN IN FIGURE 1.**

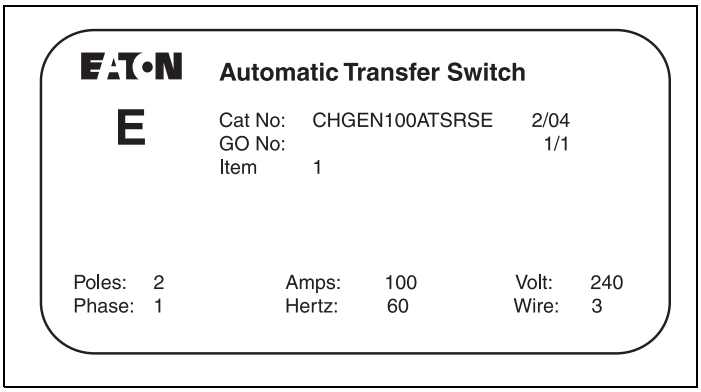


**Figure 1. Typical Automatic Transfer Switch Equipment Nameplate.**

All possible contingencies that may arise during installation, operation, or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is required by the purchaser regarding a particular installation, application, or maintenance activity, please contact an authorized Eaton sales representative or the installing contractor.

# SECTION 1: INTRODUCTION

## 1.1 Preliminary Comments and Safety Precautions

This technical document is intended to cover most aspects associated with the installation, application, operation, and maintenance of the CHGEN Automatic Transfer Switch (ATS). It is provided as a guide for authorized and qualified personnel only. Please refer to the specific WARNING and CAUTION in Section 1.1.2 before proceeding. If further information is required by the purchaser regarding a particular installation, application, or maintenance activity, please contact an authorized Eaton sales representative or the installing contractor.

### 1.1.1 Warranty and Liability Information

No warranties, expressed or implied, including warranties of fitness for a particular purpose of merchantability, or warranties arising from course of dealing or usage of trade, are made regarding the information, recommendations, and descriptions contained herein. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability, or otherwise for any special, indirect, incidental or consequential damage, or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information and descriptions contained herein.

### 1.1.2 Safety Precautions

All safety codes, standards, and/or regulations must be strictly observed in the installation, application, operation, and maintenance of this device.

## ⚠ WARNING

**THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONAL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO ENSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE.**

## ⚠ CAUTION

**READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, APPLICATION, OPERATION, OR MAINTENANCE OF THE EQUIPMENT. IN ADDITION, ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. ANY WIRING INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE.**

## 1.2 General Information

ATSs are used to protect critical electrical loads against loss of power. The load's utility (Source 1) power source is backed up by a generator (Source 2) power source. An ATS is connected to both the utility and generator power sources and supplies the load with power from one of these two sources. In the event that power is lost from the utility power source, the ATS transfers the load to the generator power source. Once the utility power is restored, the load is automatically transferred back to the utility power source (Figure 2).

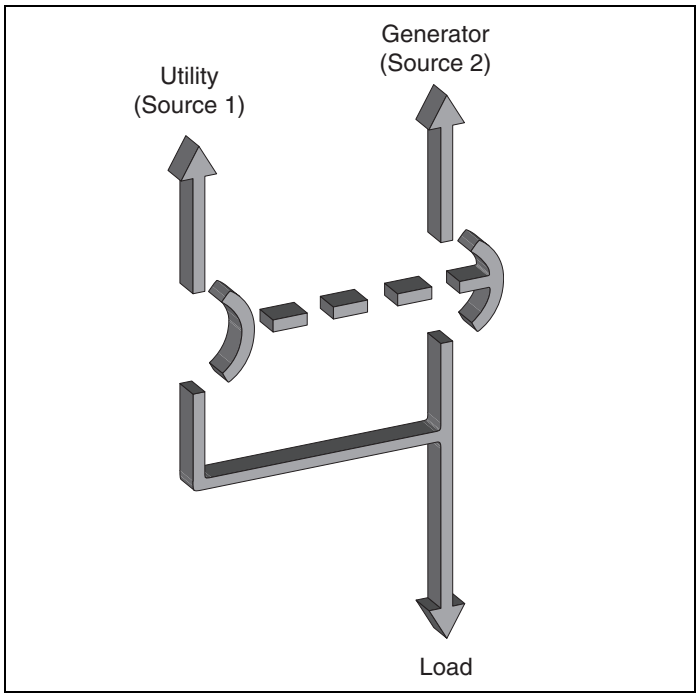


**Figure 2. Typical Load Transfer Switch (Contactor) Schematic.**

An intelligence system initiates the transfer when the utility power source fails or falls below a preset voltage. An engine start is then initiated and the ATS transfers to the generator power source when sufficient generator voltage is available. When the utility power source is restored, the ATS automatically transfers back and the generator will shut down after a time delay. In the event the utility power source fails and the generator power source does not appear, the ATS remains connected to the utility power source until the generator power source does appear. Conversely, if connected to the generator power source and the generator power source fails while the utility power source is still unavailable, the ATS remains connected to the generator power source.

ATSs automatically perform the transfer function, and include three basic elements.

1. Main contacts to connect and disconnect the load to and from the source of power.
2. Solenoids to make the transfer of the main contacts from source to source.
3. Intelligence/supervisory circuits to constantly monitor the condition of the power sources and thus provide the intelligence necessary for the switch and related circuit operation.

### 1.2.1 Design Configuration

The Eaton ATS is a rugged, compact design that utilizes contactors to transfer essential loads from one power source to another (see Figure 3). The ATS contains suitable mechanical and electrical interlock switches to eliminate the possibility of connecting the utility service to the generator output. In addition, a manual override lever is provided for the transfer function.

**⚠ WARNING**

**DO NOT MANUALLY TRANSFER THE SWITCH WHILE UNDER LOAD.**

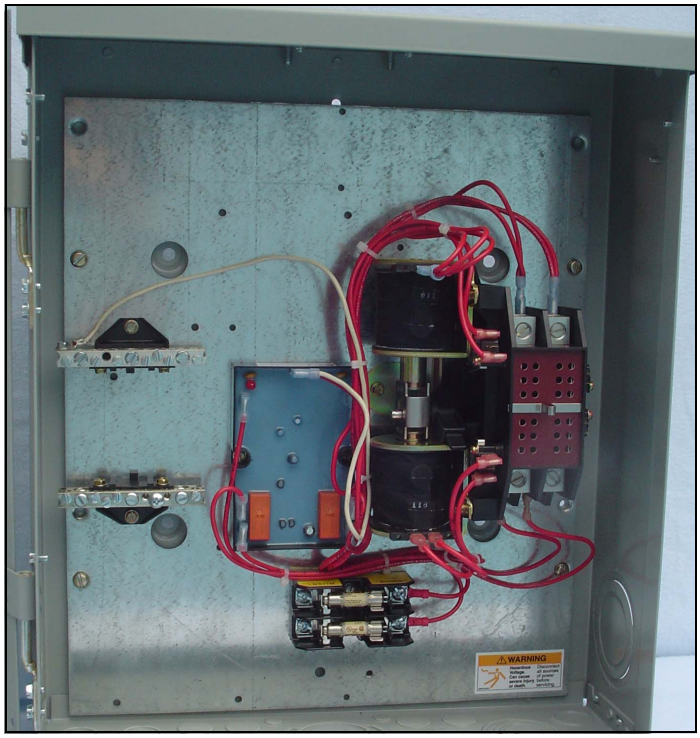

**Figure 3. CHGEN ATS (100 A).**

### 1.2.2 Optional Service Entrance Feature

The ATS can be ordered in either a standard or service entrance (SE) configuration. When ordered as an SE, integral overcurrent protection is built into the switch. Therefore, the ATS can be installed at the point of service entrance without the need for an upstream disconnect device. Also the switch comes with a generator breaker on the generator (Source 2) side of the contactor (see Figure 5a and 5b).The generator breaker can be switched OFF to prevent the transfer of power from the generator source to the load, if the service entrance breaker is switched OFF manually (Not an overload condition).

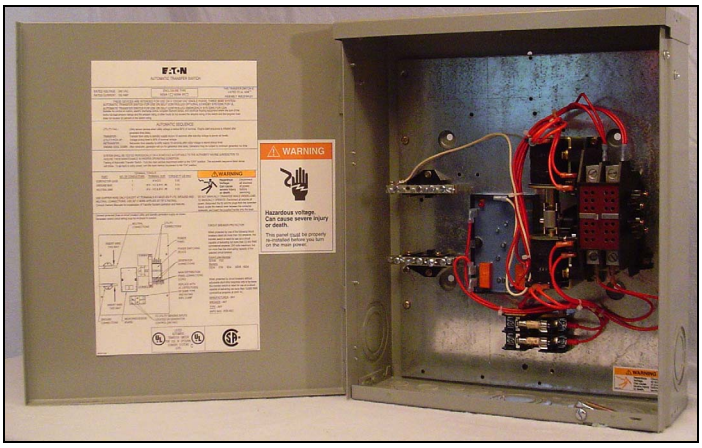


**Figure 4. A Standard ATS.**

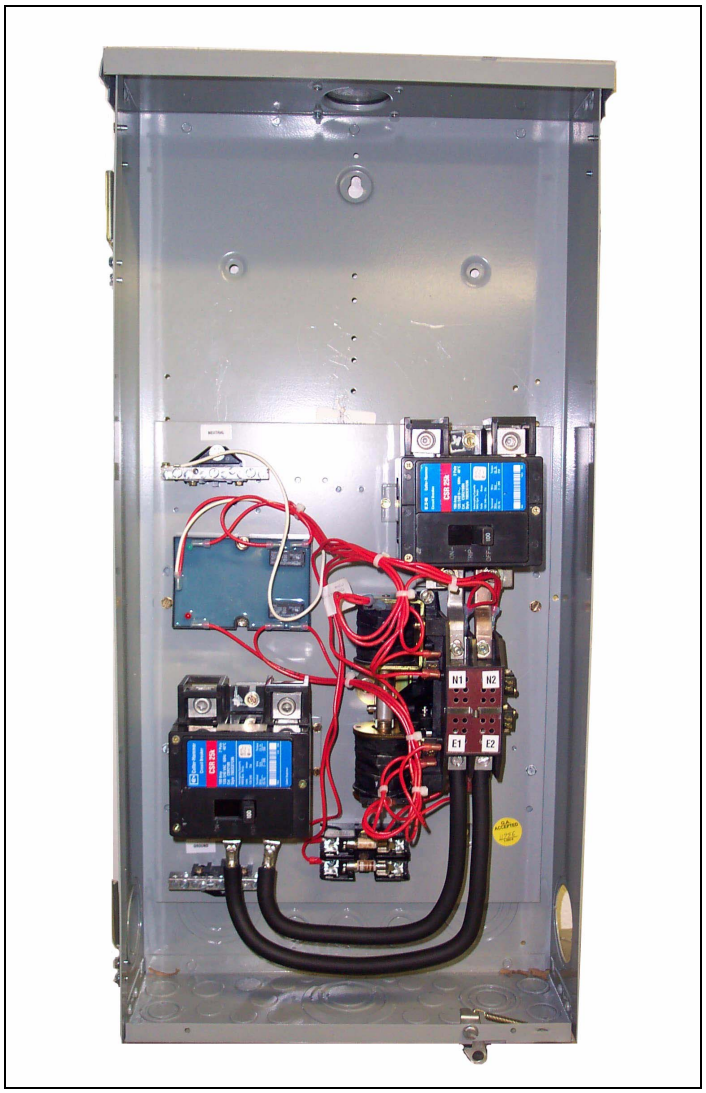


**Figure 5a. An SE ATS 100A.**

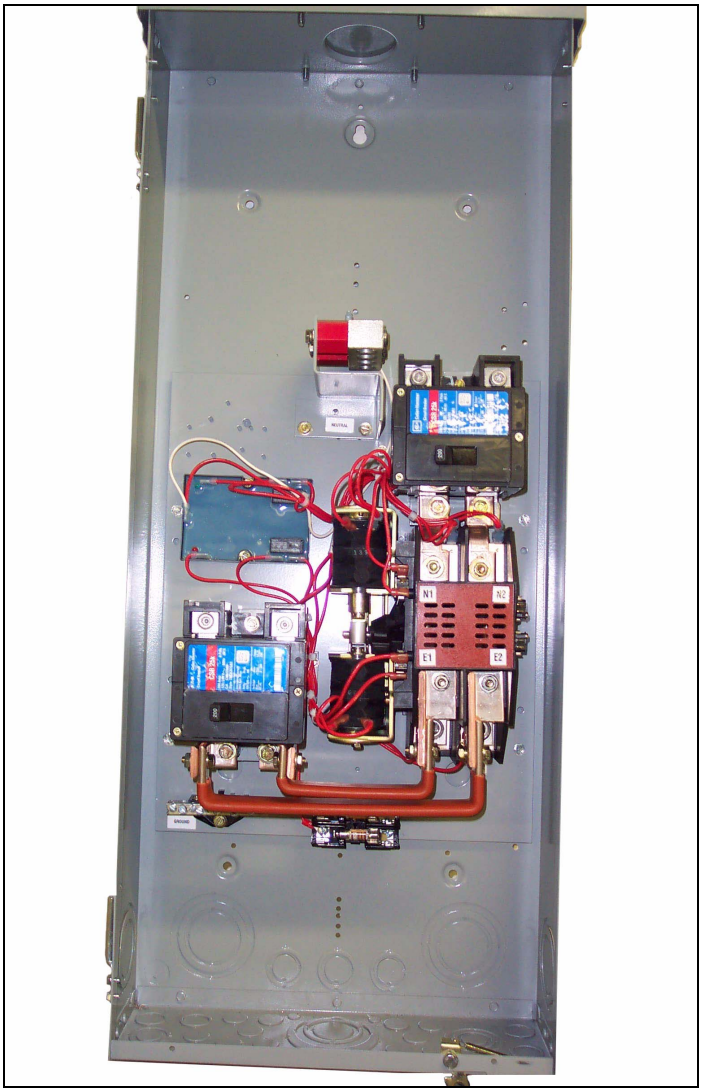


**Figure 5b. An SE ATS 200A.**

The benefits of the SE configuration are:

- Combined service disconnect and over-current protection in the ATS reduces the overall equipment and installation costs.
- Fewer components and power connections reduce maintenance requirements.

### 1.2.3 Optional TVSS Surge Protection

Transient voltage surge suppressor (TVSS) surge protection is available as an optional feature on all CHGEN ATSs. If you have ordered an optional TVSS, the TVSS will be included with the CHGEN ATS, but it is up to the installer to mount and wire the TVSS and associated fuse block. See examples in Figures 6 and 7, and see Sections 7.1 and 7.2 for complete instruction for installing the optional TVSS.

### 1.2.4 Optional Load Shed

Four sets of contacts are available and can be used to control large connected loads on the generator (i.e. air conditioners, hot tubs, etc.). See Section 7.5 for complete instructions for installing the optional load shed.

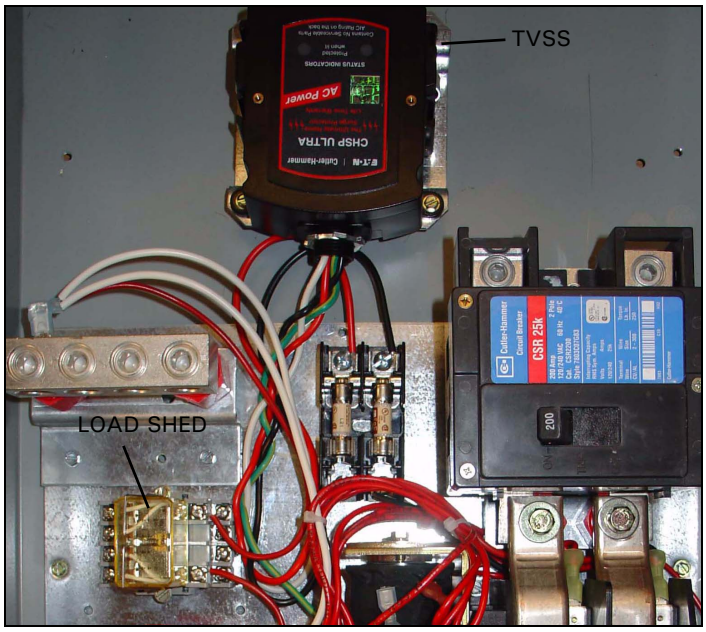


**Figure 6. TVSS and Load Shed Mounted in an SE Enclosure.**

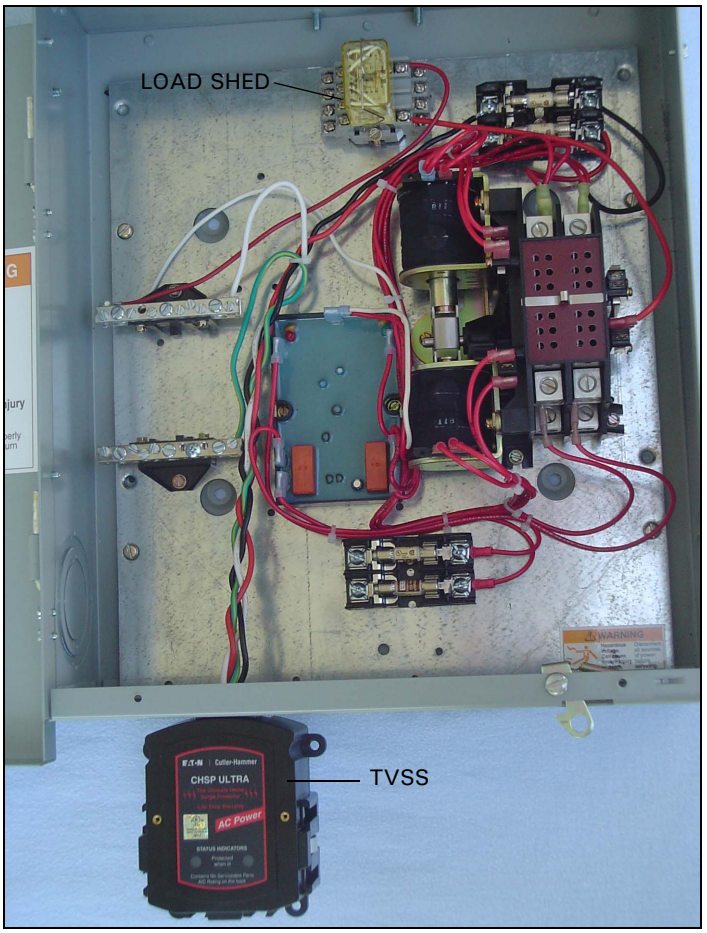


**Figure 7. TVSS Mounted to the Outside of a Standard Enclosure.**

### 1.2.5 Optional Telephone and Cable Surge Protection

The telephone line surge protection feature offers 4-pair telephone line protection. The feature ships loose for customer mounting convenience. See Section 7.3.

The TV and satellite cable surge protection feature offers two (2) coaxial line protection (cable/satellite TV). The feature ships loose for customer mounting convenience. See Section 7.4.

### 1.3 Transfer Switch Catalog Number Identification

ATS equipment catalog numbers provide a significant amount of relevant information pertaining to a specific piece of equipment. The Catalog Number Identification Table (see Table 1) provides the required interpretation information. An example is offered to initially simplify the process.

The catalog number CHGEN100ATSRSE describes an ATS.

**Table 1. ATS Catalog Number Explanation.**

| POSITIONS 1-2 | POSITION 3-5 | POSITION 6-8 |
|---|---|---|
| Manufacturer | Type | Ampere Rating |
| Cutler-Hammer CH | Generator GEN | 100 A – 100<br>200 A – 200 |

| POSITION 9-11 | POSITION 12 | POSITION 13-14 |
|---|---|---|
| Type | Enclosure | Service Entrance |
| Automatic ATS Transfer Switch | NEMA 3R R | Standard Blank<br>Service EntranceSE |

### 1.4 Environmental and Operational Conditions

Normally, an ATS is applied indoors in an electrical equipment room. It can also be used for normal outdoor applications (with a Nema 3R enclosure) where the equipment is subject to falling rain, freezing temperatures, and 95% humidity (non-condensing). The ambient temperature range for operation is between -20 and 70°C (-4 and 158°F).

### Seismic

With proper installation, these transfer switches have a seismic capability which exceeds the worst case Zone 4 required levels per both the Uniform Building Code and the California Building Code.

## SECTION 2: RECEIVING, HANDLING, AND STORAGE

### 2.1 Receiving

Every effort is made to ensure that the ATS equipment arrives at its destination undamaged and ready for installation. The packing is designed to protect the internal components as well as the enclosure. Care should be exercised, however, to protect the equipment from impact at all times. Do not remove the protective packaging until the equipment is at the installation site and ready to be installed.

When the ATS equipment reaches its destination, the customer should inspect the shipping container for any obvious signs of rough handling and/or external damage that occurred during transportation. Record any external and internal damage for reporting to the transportation carrier and to the Eaton sales representative, once a thorough inspection is complete. All claims should be as specific as possible and include the Shop Order and General Order numbers.

A shipping label affixed to the shipping container includes a variety of equipment and customer information, such as General Order and Customer numbers. Make certain that this information matches the other shipping paper information.

Each ATS enclosure is packaged in its own box. Heavy-duty cardboard sides surround the enclosure. Do not discard the packing material until the equipment is ready for installation.

Once the top packaging is removed from the shipment, the enclosure door can be opened. A plastic bag of documents will be found in the enclosure. Important documents, such as wiring diagrams and appropriate instruction leaflets are enclosed within the bag and should be filed in a safe place.

### 2.2 Handling

As previously mentioned, ATS equipment is packaged in its own box. Protect the equipment from impact at all times and do not double stack. Once the equipment is at the installation site and ready to be installed, the packaging material can be removed. Refer to Section 4 of this manual for specific installation instructions.

### 2.3 Storage

Although well packaged, this equipment is not suitable for outdoor storage. The equipment warranty will not be applicable if there is evidence of outdoor storage. If the equipment is to be stored indoors for any period of time, it should be stored with its protective packaging material in place. Protect the equipment at all times from excessive moisture, construction dirt, corrosive conditions, and other contaminants. It is strongly suggested that the package-protected equipment be stored in a climate-controlled environment of -20 to 65°C (-4 to 149°F), with a relative humidity of 80% or less. Do not, under any circumstance, stack other equipment on top of an ATS equipment enclosure, whether packaged or not.

# SECTION 3: EQUIPMENT DESCRIPTION

## 3.1 Introduction

The Eaton ATS is assembled and tested at the factory. It is designed to be used in conjunction with standby power distribution equipment to provide an alternate source of power to critical circuits in the event that the primary power source is interrupted.

This ATS monitors both utility (Source 1) and generator (Source 2) power sources and automatically transfers critical load circuits between the two sources, depending on which source is available. The utility power source is preferred and will remain connected to the switch if it is available.

## 3.2 Features

The following section describes the standard features in the CHGEN ATS.

**Note:** The time delays are not adjustable.

1. Time Delay Normal (Utility) to Emergency (Generator) (TDNE)

   This feature delays the transfer from the utility (Source 1) power source to the generator (Source 2) power source in order to override momentary utility power source outages and/or fluctuations. Timing begins when the generator power source becomes available. Should the utility power source fail, the generator will start up after its time delay. The TDNE timer is set for 50 seconds.

2. Time Delay on Engine Starting (TDES)

   This feature delays initiation of the generator engine start circuit in order to override momentary utility (Source 1) power source outages and/or fluctuations. It does not affect the ability of the transfer switch to transfer from the utility power source to the generator (Source 2) power source. The TDES timer is dependent on the generator.

3. Time Delay Emergency (Generator) to Normal (Utility) (TDEN)

   This feature delays the transfer from the generator (Source 2) power source to the utility (Source 1) power source to allow the utility power source to stabilize before the transfer is initiated. Timing begins when the utility power source becomes available. If the generator power source fails during timing, the time delay is overridden and an immediate transfer to the utility power source will occur. The TDEN timer is set for 10 seconds.

   Failsafe

   Failsafe refers to the condition whereby the ATS is connected to the generator (Source 2) power source. In the event that the generator power source fails and the utility (Source 1) power source is available, an immediate retransfer to the utility power source will occur.

4. Time Delay Engine Cool-off (TDEC)

   This feature allows the generator engine to run after the ATS returns to the utility (Source 1) power source without load. The generator will run for its time delay.

5B. Undervoltage Sensing for Emergency (Generator) Source

   This feature enables the logic to constantly monitor the generator (Source 2) power source. The logic prevents transfer from the utility (Source 1) power source to the generator power source until the generator power source has reached an acceptable operating voltage and frequency. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage.

26. Undervoltage Sensing for Normal (Utility) Source

   This feature enables the logic to constantly monitor the utility (Source 1) power source. The logic prevents transfer from the generator (Source 2) power source to the utility power source until the utility power source has reached an acceptable operating voltage. Dropout is set at 80% of nominal voltage and pickup is set at 90% of nominal voltage.

## 3.3 Optional Features

The following is a list of optional features for the CHGEN ATS.

36. Load Shed

   Four sets of contacts are available and can be used to control large connected loads on the generator (i.e. air conditioners, hot tubs, etc.).

37. Service Equipment Rated Transfer Switch

   This feature provides the label "Suitable for use as Service Equipment" and the features necessary to meet the requirements for the label.

51H. CHSPULTRA

   This feature provides a 70KA, 240/120VAC, 1 Ohm surge device. It can be mounted on the Source 1 line. The feature ships loose for customer mounting convenience.

51J. Telephone Surge Protection

   The telephone line surge protection feature offers 4-pair telephone line protection. The feature ships loose for customer mounting convenience.

51K. Cable Surge Protection

   The TV and satellite cable surge protection feature offers 2 coaxial line protection (cable/satellite TV). The feature ships loose for customer mounting convenience.

## 3.4 Standards

Eaton ATS equipment, enclosed in NEMA 3R enclosures, are listed for application by UL. In addition, Eaton ATSs are listed in File E38116 by Underwriters Laboratories, Inc. under Standard UL 1008. This standard covers the requirements for ATSs intended for use in ordinary locations to provide lighting and power as follows:

a. In standby systems, in accordance with article 702 of the National Electrical Code.

Eaton ATSs are available to meet NFPA 110 for standby power systems.

Eaton ATS equipment are listed for application by CSA. In addition, Eaton ATSs are listed in the Legacy File LR96245 Master Contract 163545 by Canadian Standards Association under Standard 22.2 #178-1978

## SECTION 4: INSTALLATION AND WIRING

### 4.1 General

Eaton ATSs are factory wired and tested. Installation requires solidly mounting the enclosed unit and connecting the power cables and the auxiliary pilot circuits. Physical mounting procedures and power cable connections are covered in this section.

Once a transfer switch is properly installed and wired, it should be mechanically and electrically checked for proper installation and operation. The procedures for these initial mechanical and electrical checks are outlined in Section 5 of this manual.

### 4.2 Mounting Location

Choose a location that offers a flat, rigid mounting surface capable of supporting the weight of the enclosed ATS equipment (see Figure 8, 100 A Standard, Figure 9, 100 A SE, Figure 10, 200 A Standard, or Figure 11, 200 A SE). Protect the transfer switch at all times against excessive moisture, dust, dirt, lint, and corrosive vapors.

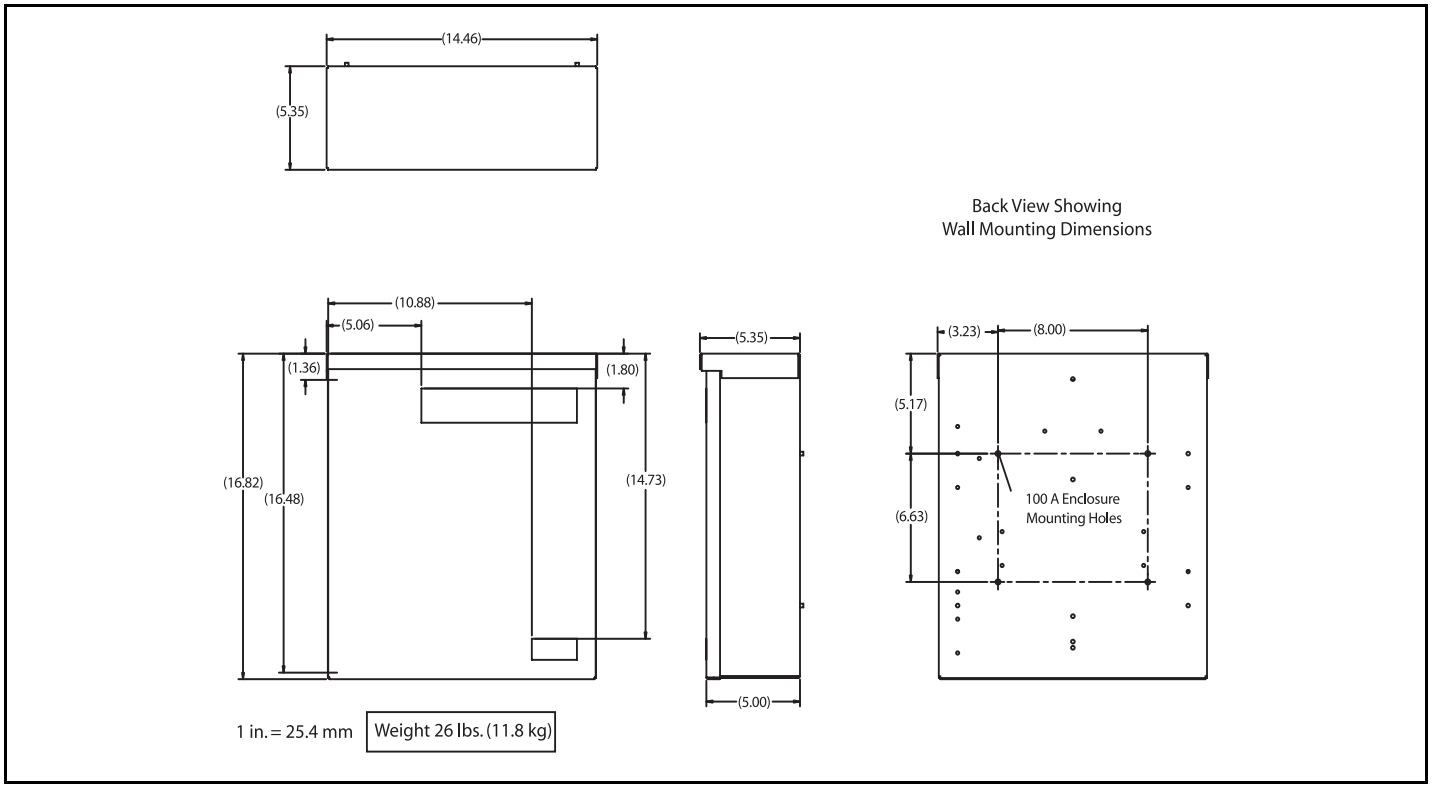


**Figure 8. Dimensions and Plan View of Standard CHGEN Automatic Transfer Switch (in.) (100 A).**

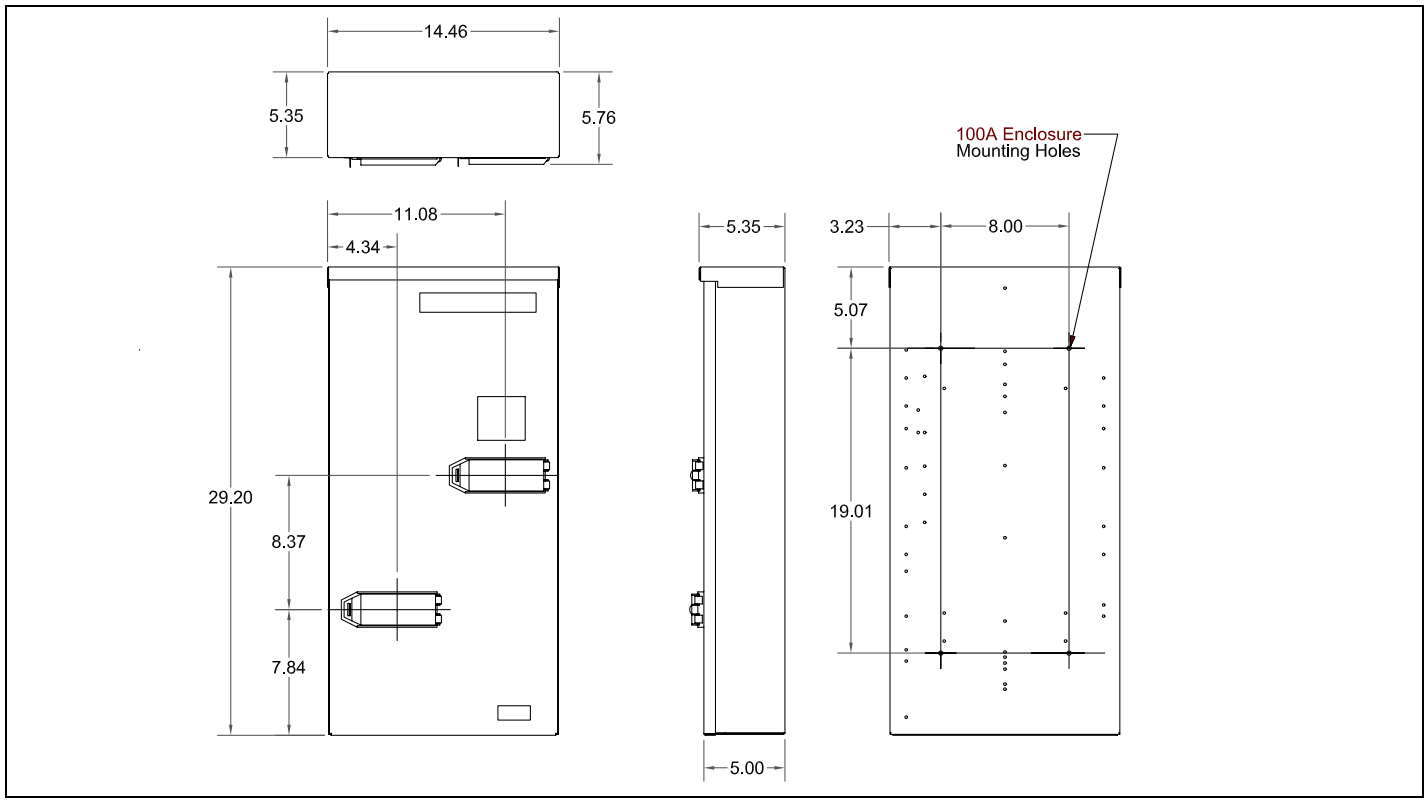


**Figure 9. Dimensions and Plan View of SE CHGEN Automatic Transfer Switch. (in.) (100 A).**

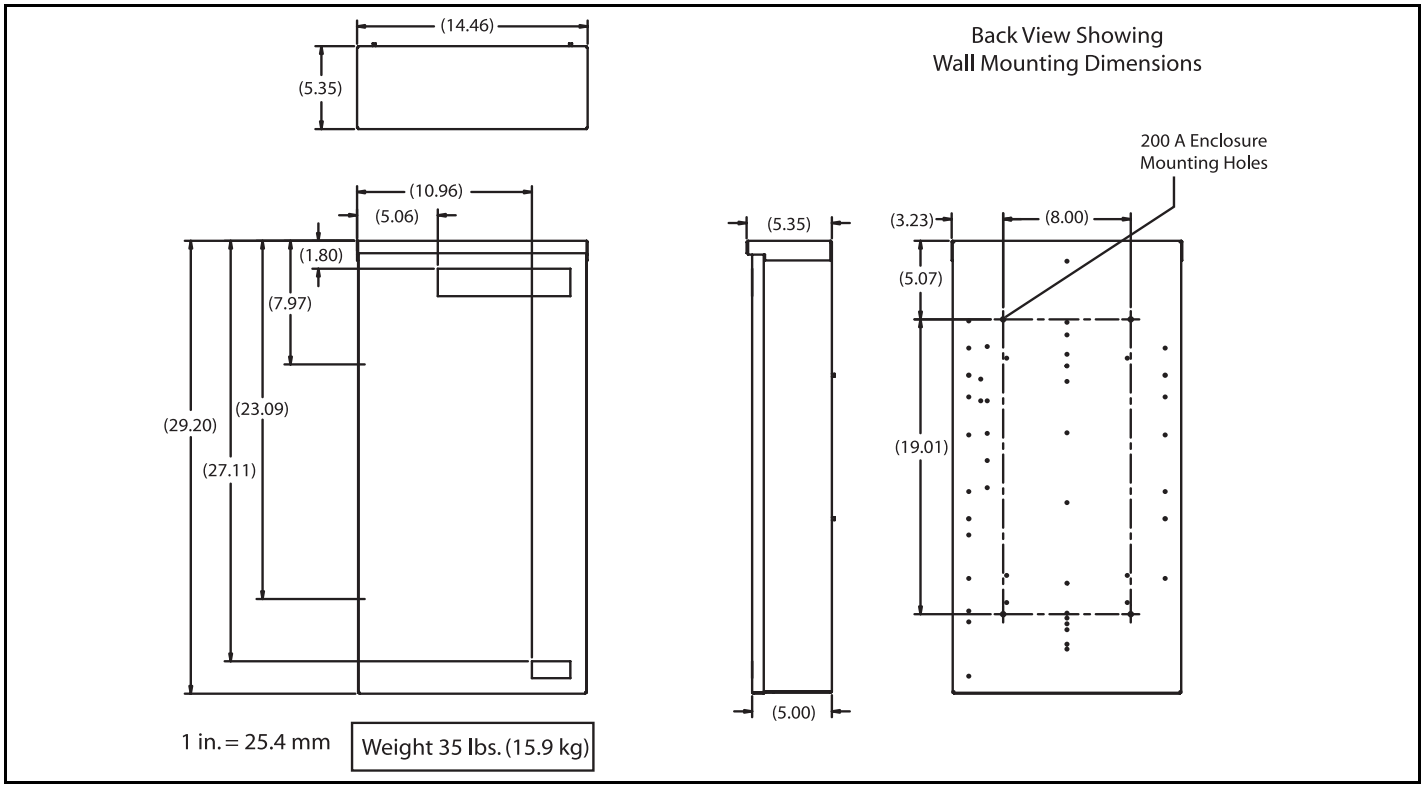


**Figure 10. Dimensions and Plan View of Standard CHGEN Automatic Transfer Switch (in.) (200 A).**

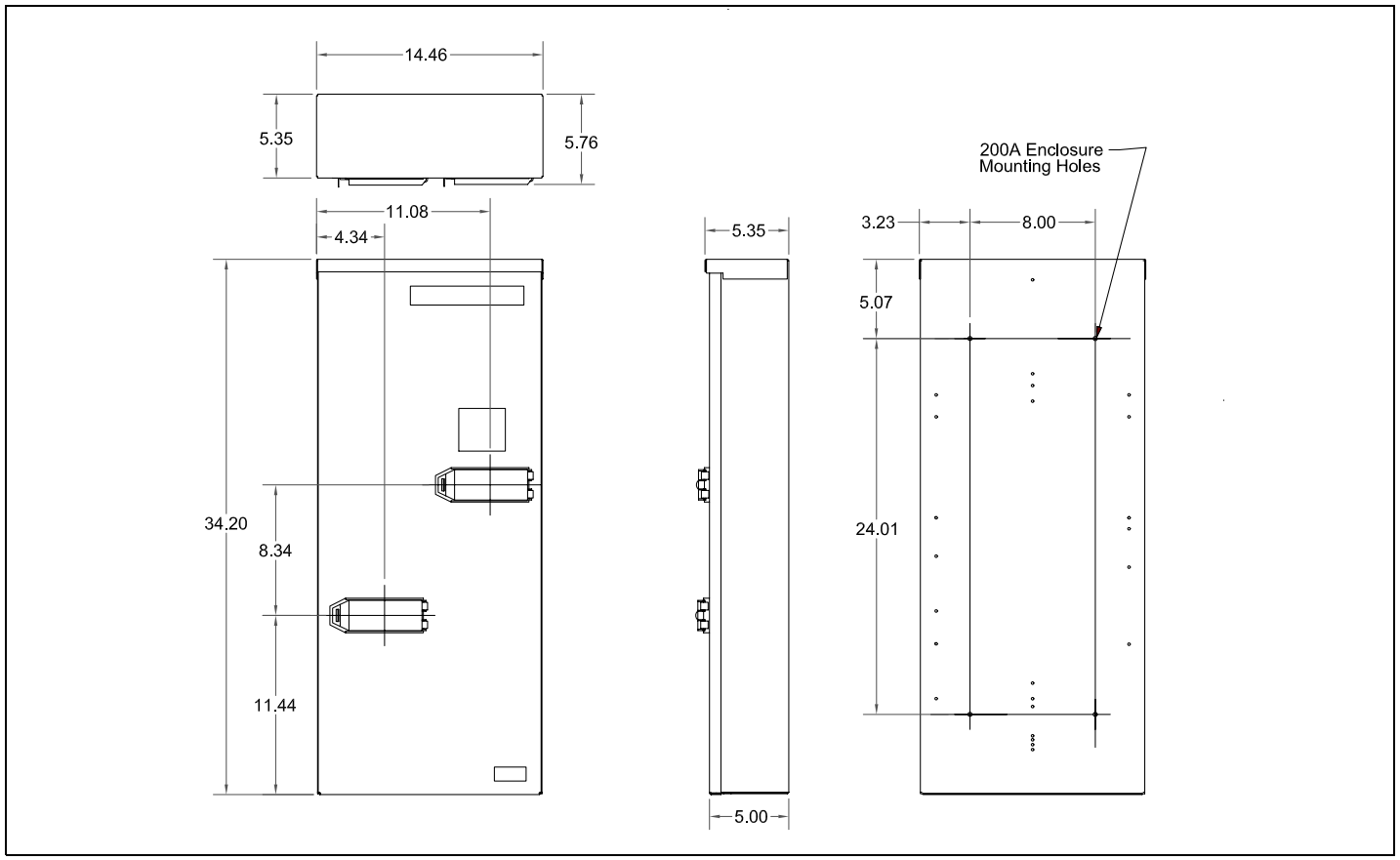


**Figure 11. Dimensions and Plan View of SE CHGEN Automatic Transfer Switch (in.) (200 A).**

Check to ensure there are no pipes, wires, or other mounting hazards in the immediate mounting area that could create a problem.

Carefully remove all packing material from the ATS enclosure at the installation site. Even though an equipment inspection was performed when the equipment was received, make another careful inspection of the enclosure and the ATS mechanism as the packing material is removed and the enclosure readied for mounting. Be especially alert for distorted metal, loose wires, or damaged components.

### 4.3 Mounting Procedure

**⚠ CAUTION**

**EXTREME CARE SHOULD BE TAKEN TO PROTECT THE ATS FROM DRILL CHIPS, FILINGS, AND OTHER CONTAMINANTS WHEN MAKING THE CABLE ENTRY HOLES AND MOUNTING THE ENCLOSURE TO PREVENT COMPONENT DAMAGE OR A FUTURE MALFUNCTION.**

**NOTICE**

**THE INSTALLATION MUST FULLY COMPLY WITH ALL APPLICABLE CODES, STANDARDS, AND REGULATIONS.**

With the enclosed ATS equipment unpacked and ready for mounting, proceed with the following steps.

**Step 1:** Depress the padlockable catch at the bottom of the door and slide the door downward (see Figure 12). Open the door.

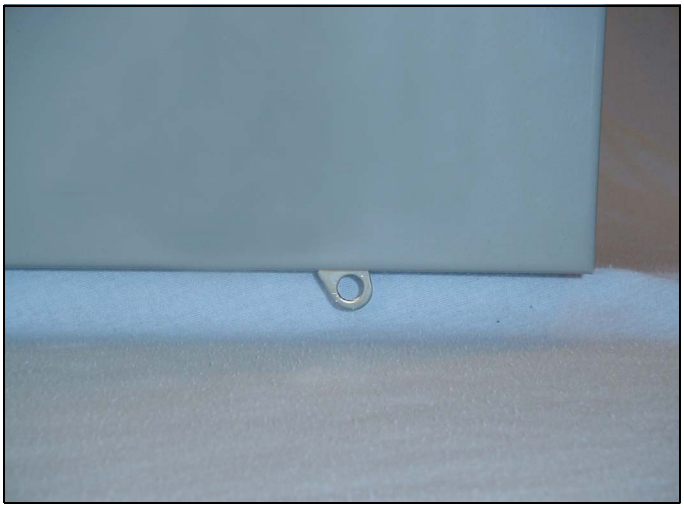

**Figure 12. Location of the Door Latch.**

**Step 2:** Use the knockouts for cable entry and control wiring.

**NOTICE**

**GENERATOR CONTROL CIRCUIT WIRING MUST BE RUN SEPARATE FROM POWER CABLES.**

**Step 3:** Mount the switch to a rigid structure as close to the electrical loads as possible.

### 4.4 Power Cable Connection

**⚠ WARNING**

**POWER CONDUCTORS MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER OR CONTROL CIRCUIT CONDUCTORS TO BE CONNECTED TO THE ATS EQUIPMENT BEFORE BEGINNING TO WORK WITH THE CONDUCTORS AND/OR TERMINATING THEM TO THE EQUIPMENT.**

**⚠ CAUTION**

**TO HELP PREVENT COMPONENT DAMAGE OR FUTURE MALFUNCTIONS, USE EXTREME CARE TO KEEP CONTAMINANTS OUT OF THE ATS EQUIPMENT WHEN MAKING THE POWER CABLE CONNECTIONS**

Test all power cables prior to connection to the unit to ensure that the conductors or cable insulation has not been damaged while being pulled into position.

Power cables are to be connected to solderless, screw type lugs located on the automatic transfer switching devices. Verify that the lugs supplied will accommodate the power cables being used. Also verify that the cables comply with all local electrical codes. Standard ATS equipment, as supplied from the factory, will accommodate the wire sizes shown in Table 2.

**Table 2. Wire Sizes for ATSs.**

| TRANSFER SWITCH AMP RATING | CONTACTOR WIRE SIZE RANGE | NUMBER OF CABLES PER PHASE |
|---|---|---|
| 100 | #14 – 2/0 | 1 |
| 200 | #6 – 290 KCMIL | 1 |

Carefully strip the insulation from the power cables to avoid nicking or ringing of the conductor strands. Prepare the stripped conductor termination end by cleaning it with a wire brush. If aluminum conductors are used, apply an appropriate joint compound to the clean conductor surface area.

**⚠ CAUTION**

**IMPROPER POWER CABLE CONNECTIONS CAN CAUSE EXCESSIVE HEAT AND SUBSEQUENT EQUIPMENT FAILURE.**

**Note:** Tighten the cable lugs to the torque identified on the label affixed to the unit's door.

**Step 1:** Connect cables as follows (see Figures 13 and 14, and Table 2):

- The utility (Source 1) power cables to the utility lugs or SE breaker if installed;
- The generator (Source 2) power cables to the generator lugs or generator breaker lugs (for SE only);
- The customer load cables to the main distribution panel (load) lugs;
- The neutral cables to the neutral bar; and
- The ground wires to the ground bar.

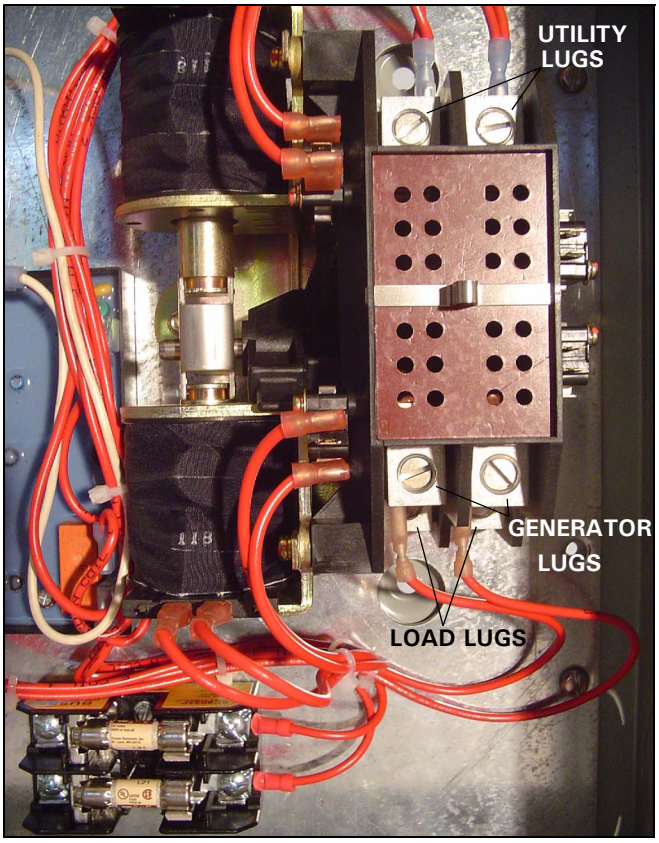


**Figure 13. Cable Connection Locations (100 A).**

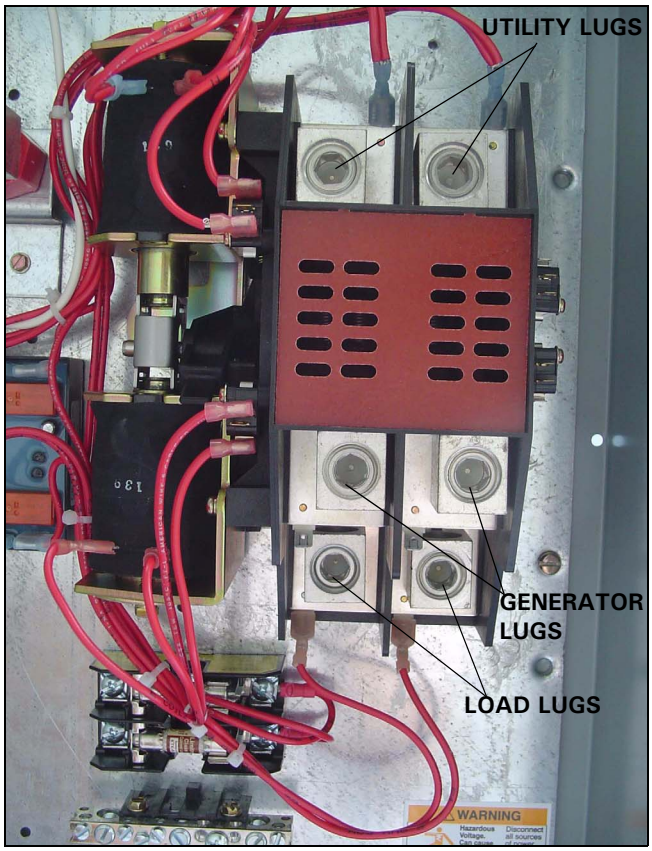


**Figure 14. Cable Connection Locations (200 A).**

**Step 2:** The utility sensing fuse block is located at the bottom center of the power panel and is used to supply 240 Vac to the generator (See Figure 15). See Section 4.7 for more detailed information on connecting these inputs.

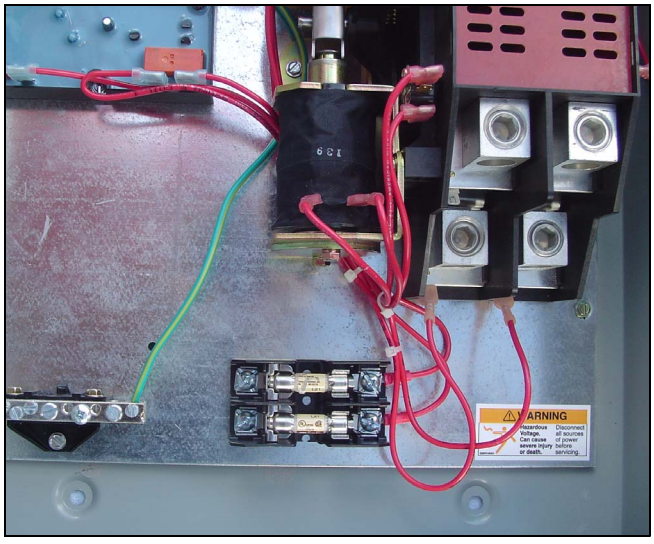

**Figure 15. Utility Sensing Fuse Block Location.**

**Step 3:** Tighten all cables and wiring to specifications.

## 4.5 Wiring

**⚠ WARNING**

**POWER CONDUCTORS AND SENSING WIRES MAY HAVE VOLTAGE PRESENT THAT CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. DE-ENERGIZE ALL POWER OR CONTROL CIRCUIT CONDUCTORS BEFORE BEGINNING TO PERFORM ANY WIRING ACTIVITY TO OR WITHIN THE ATS EQUIPMENT.**

**⚠ CAUTION**

**CHECK THE ATS EQUIPMENT NAMEPLATE FOR RATED VOLTAGE. IT SHOULD BE THE SAME AS THE UTILITY (SOURCE 1) AND GENERATOR (SOURCE 2) LINE VOLTAGES. OPERATING THE EQUIPMENT ON IMPROPER VOLTAGE CAN CAUSE EQUIPMENT DAMAGE.**

## 4.6 Installation

In a typical installation for critical loads (see Figure 16), the ATS (1) and the generator (2) are connected to the power supply. The ATS (1) and emergency distribution panel (3) receive utility (Source 1) power from a dedicated breaker in the utility service panel (4). The ATS and emergency panel receive generator (Source 2) power from the generator (2). Power from the utility feeds the utility panel.

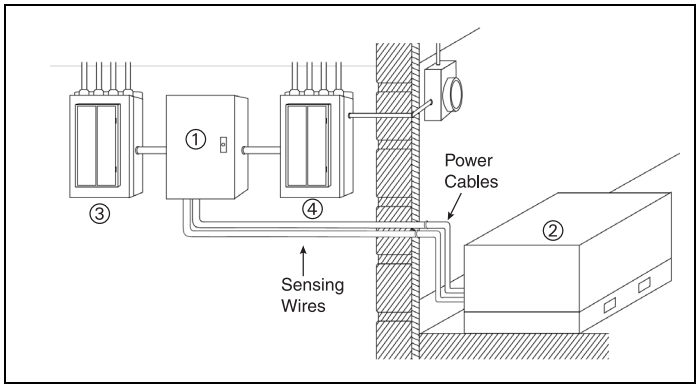


**Figure 16. Typical Installation of a Light Commercial ATS.**

The switch (1) and generator (2) are connected to the power supply. The ATS is located between the emergency distribution (3) and the utility panel (4).

When the utility power fails, the ATS will sense the failure, the generator will start, and when sufficient generator voltage is available, the ATS will switch all loads to the emergency panel. All emergency loads will receive power from the generator. A line breaker is required between the generator power source and the transfer switch (see Figure 17). When utility power returns, the ATS will switch all power back to the utility panel and the generator will shut down.

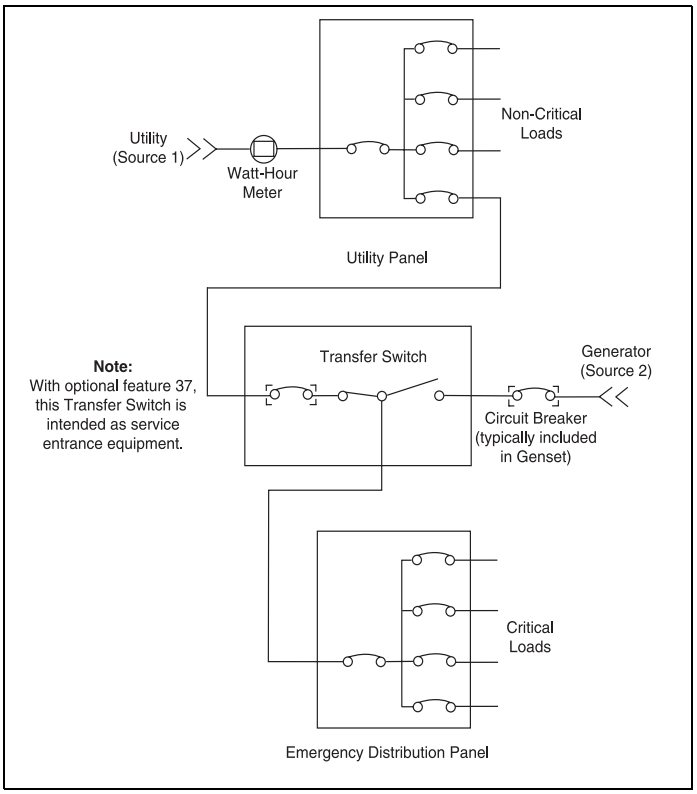


**Figure 17. Diagram of a Typical Installation (Critical Loads Only).**

In addition, another typical installation for loads can be considered (see Figure 18). Refer to Figure 19 for a loads connection diagram.

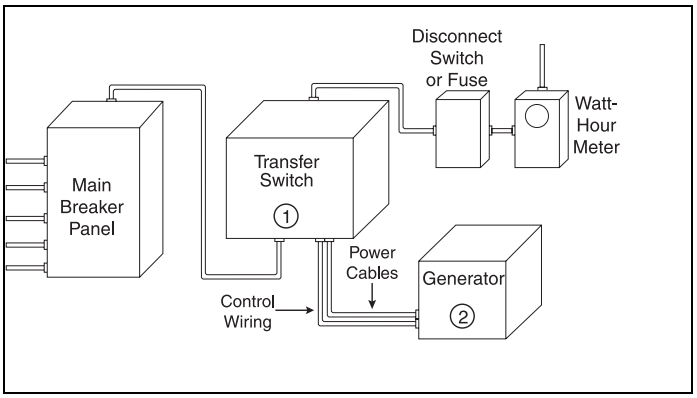


**Figure 18. Typical Installation of a Light Commercial ATS.**

The switch (1) and generator (2) are connected to the power supply. The ATS is located between the utility and the loads.

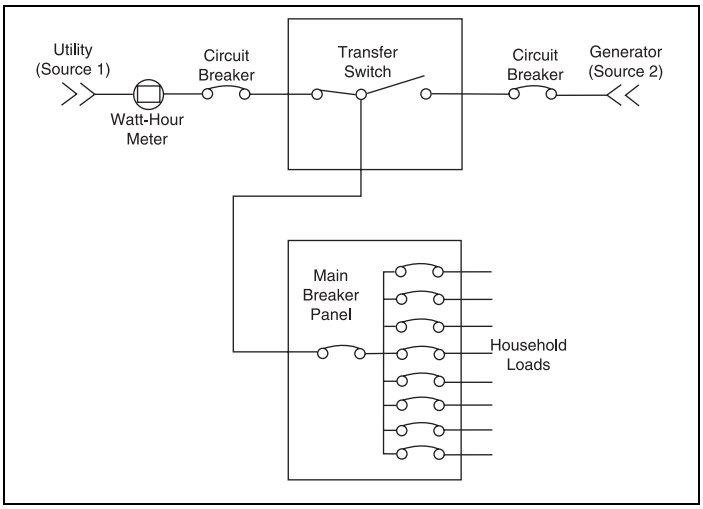


**Figure 19. Diagram of a Typical Installation (All Loads).**

## 4.7 Utility Sensing Fuse Block Connection

The generator's 240 Vac utility sensing fuse block is located at the bottom center of the power panel of the ATS (Figure 15).

Prior to making the sensing inputs connection to the ATS, set the generator control selector switch to the OFF position to prevent an unwanted engine start.

Connect the sensing wires to the fuse block. These wires should be connected to the side of the fuse block with no existing wires. See Section 6 (Figure 20) for the wiring diagram.

## 4.8 Preliminary Checks

After the ATS enclosure is installed and power cables are connected to the equipment, thoroughly inspect the unit to ensure that no tools were left inside and that the cabinet is free of debris. If necessary, use a vacuum cleaner to remove any and all construction or installation debris from the equipment.

Read and understand all labels on the equipment. Review and understand the wiring diagrams supplied with the equipment. Note any optional accessories that may have been furnished with this unit and review their operation.

Verify that the phase-to-phase line voltages of both the utility (Source 1) and generator (Source 2) power sources are the same and that they match the rated voltage as indicated on the ATS ratings label.

**⚠ CAUTION**

**SEVERE EQUIPMENT DAMAGE CAN RESULT IF THE UNIT IS NOT APPLIED AT PROPER VOLTAGE. DO NOT ENERGIZE THE EQUIPMENT IF THE SUPPLY VOLTAGES DO NOT MATCH EQUIPMENT RATINGS LABEL.**

## SECTION 5: FUNCTIONAL TESTING

### ⚠ WARNING

**YOU ARE READY TO ENERGIZE THE EQUIPMENT. VOLTAGES WITHIN THE ENCLOSURE ARE CAPABLE OF CAUSING SEVERE PERSONAL INJURY OR DEATH. USE EXTREME CAUTION TO AVOID CONTACT WITH ENERGIZED EQUIPMENT.**

### 5.1 Preliminary Checks

**Step 1:** Check all loads connected to the ATS to ensure that they are ready to be energized.

### 5.2 Energize the Switch

**Step 1:** Close the upstream utility (Source 1) power source breaker or switch to connect the ATS to the utility power source voltage.

**Step 2:** If the ATS unit is not already in the UTILITY position, the solenoid will engage and the contactor will automatically switch to the UTILITY position.

**Step 3:** Using a voltmeter, measure the line-to-line and the line-to-neutral voltages across the utility line terminals to ensure the utility voltage is correct.

### ⚠ WARNING

**CONTACT WITH ENERGIZED COMPONENTS WILL CAUSE ELECTRICAL SHOCK CAPABLE OF PRODUCING SEVERE PERSONAL INJURY OR DEATH. USE EXTREME CAUTION TO AVOID CONTACT WITH ENERGIZED COMPONENTS WHEN USING A METER FOR VOLTAGE CHECKS.**

**Step 4:** Position the generator control selector switch, located on the standby generator, to the AUTO position.

**Step 5:** Close the upstream generator (Source 2) power source breaker or switch to connect the ATS to the generator power supply source.

### 5.3 Operational Checks

**Step 1:** Open the upstream utility (Source 1) breaker originally closed in Step 1 of Section 5.2.

### NOTICE

**THIS WILL SIMULATE AN INTERRUPTION OF THE UTILITY (SOURCE 1) POWER SOURCE.**

**Step 2:** After a time delay, the standby generator engine will start.

**Step 3:** The ATS Time Delay Normal (Utility) to Emergency (Generator) (TDNE) will begin to time after the generator engine begins to run. After time out, the solenoid will engage and the contactor will automatically switch from the UTILITY to the GENERATOR (Source 2) position.

**Step 4:** Using a voltmeter, measure the line-to-line and line-to-neutral voltages across the generator line terminals to ensure that the generator emergency voltage is correct. If necessary, make adjustments to the voltage regulator on the generator according to the manufacturer's recommendations to correct any voltage deviations. The ATS will only respond to the correct voltage from the generator power source.

**Step 5:** Close the utility breaker described in Step 1 of Section 5.2.

**Step 6:** The ATS Time Delay Emergency (Generator) to Normal (Utility) (TDEN) timer will begin timing, and the solenoid will engage and automatically switch from the GENERATOR to the UTILITY position and the generator will shut down.

# SECTION 6: MAINTENANCE AND COMPONENT REPLACEMENT

## 6.1 Introduction

**⚠ WARNING**

**HIGH VOLTAGES ARE PRESENT IN AND AROUND TRANSFER SWITCH EQUIPMENT. BEFORE INSPECTING OR MAINTAINING THIS EQUIPMENT, DISCONNECT THE LINE POWER FROM THE EQUIPMENT BEING SERVICED BY OPENING AND LOCKING OUT, IF POSSIBLE, THE NEXT HIGHEST DISCONNECT DEVICE. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE SEVERE PERSONAL INJURY AND/OR DEATH.**

In general, ATS equipment is designed to be relatively maintenance free under normal usage. However, because of the variability of application conditions and the importance placed on dependable operation by this type of equipment, inspection and maintenance checks should be made on a regularly scheduled basis. Since equipment maintenance will consist mainly of keeping the equipment clean, the frequency of maintenance will depend, to a large extent, on the cleanliness of its surroundings. If a significant amount of dust or foreign matter is present, a more frequent maintenance schedule should be followed.

It is suggested that visual inspections of the equipment be made on a regular basis, not just during regularly scheduled periods. Always be alert for an accumulation of dirt in and around the structure, loose parts and/or hardware, cracks and/or discoloration to insulation, and damaged or discolored components.

Figure 20 is the wiring diagram for the CHGEN ATS switch.

**Note:** Only qualified and experienced personnel should attempt any diagnostic work using this diagram.

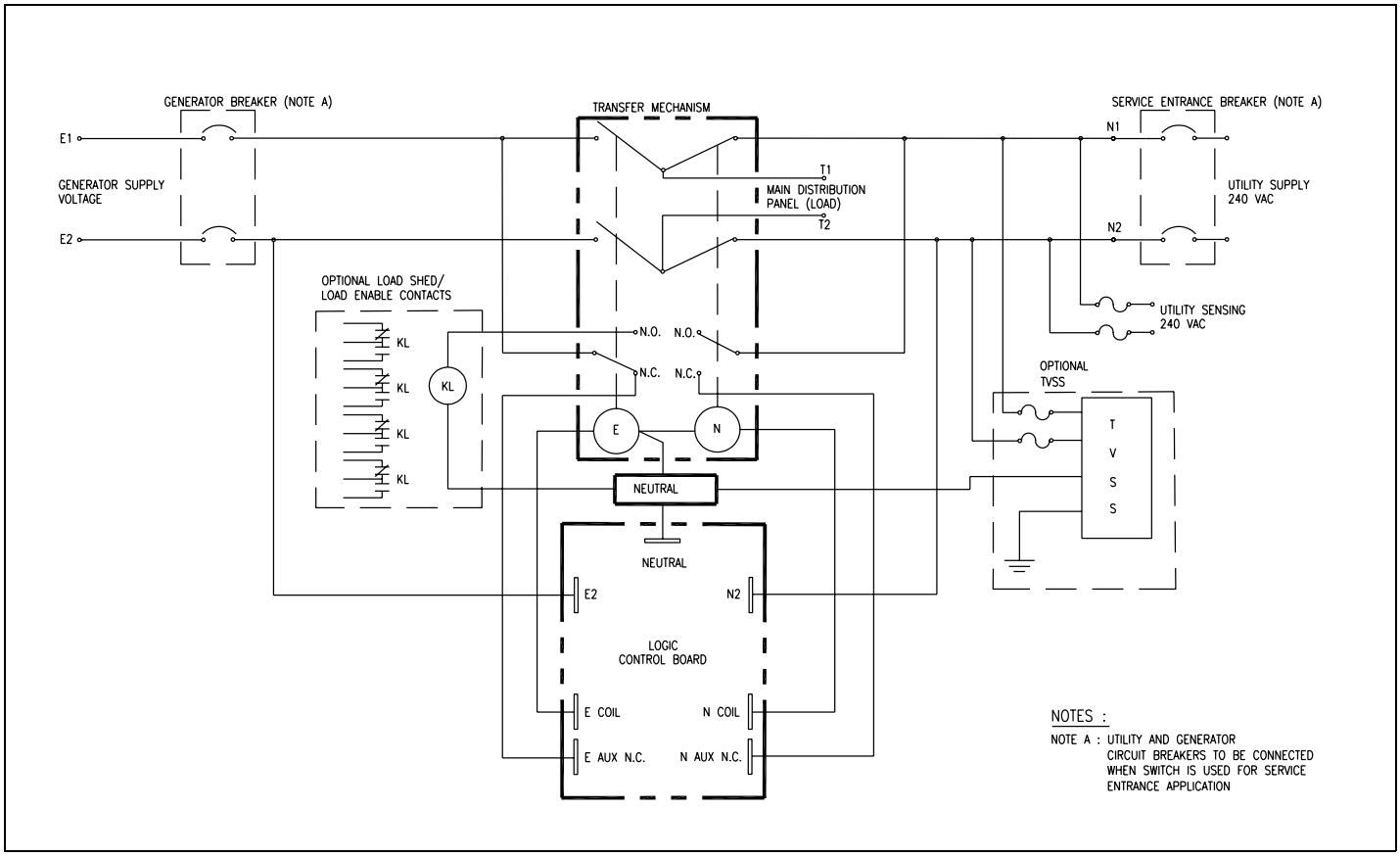


**Figure 20. Wiring Diagram for the CHGEN ATS.**

## 6.2 Procedures

A suggested maintenance procedure to be followed is outlined in Table 3.

### Table 3. Recommended Periodic Maintenance Procedures

| STEP | ACTION |
|---|---|
| a. Make the transfer switch equipment safe for inspection and/or maintenance. | Disconnect the line power from the equipment being serviced by opening next highest disconnect device. Make certain that any accessory control power is switched off. |
| b. Inspect the structure area for safety hazards or potential maintenance problems. | Inspect the area, especially where the contactor is installed, for any safety hazards, including personal safety and fire hazards. Exposure to certain chemical vapors can cause deterioration of the electrical connections.<br>Inspect for accumulated dirt, loose hardware, or physical damage.<br>Examine the primary insulation for evidence of cracking or overheating. Overheating will show as discoloration, melting, or blistering of the conductor insulation, or as pitting or melting of the conductor surfaces due to arcing.<br>Inspect the secondary control connections for damage, and control wiring for insulation integrity. |
| c. Inspect the contactor for dust, dirt, soot, grease, moisture, or corrosion. | Remove dust, dirt, soot, grease, moisture, and corrosion contamination from the surface of the switching device using a dry, soft lint-free cloth, dry soft bristle brush, and vacuum cleaner. Do not blow debris into the contactor. If contamination is found, look for the source and fix the problem. |
| d. Check for material integrity, uneven wear, discoloration, or loose hardware. | Severe material cracking will require replacement and loose hardware will need to be tightened. |
| e. Check the terminals and connectors for looseness or signs of overheating. | Overheating will show as discoloration, melting, or blistering of the conductor insulation.<br>Connections that do not have signs of looseness or overheating should not be disturbed. |
| f. Exercise the contactor if it is not often exercised while in operation. This will permit the wiping action by the contacts. | If a switching device is used for frequent switching during normal operation, this step can be disregarded. |
| g. Return the transfer switch equipment to service. | Make certain all barriers are in place and the door is closed. Re-apply generator (Source 2) and utility (Source 1) power. |

## 6.3 Maintenance Log

| DATE | ACTION |
|---|---|
| *Example:* 01/01/05 | Inspected and cleaned. |

## 6.4 Component Replacement

Certain components within the ATS are field replaceable. Figure 21 identifies the field replaceable parts. Table 4 lists the part numbers to use when ordering replacement components. To order replacement components, contact an authorized Eaton sales representative.

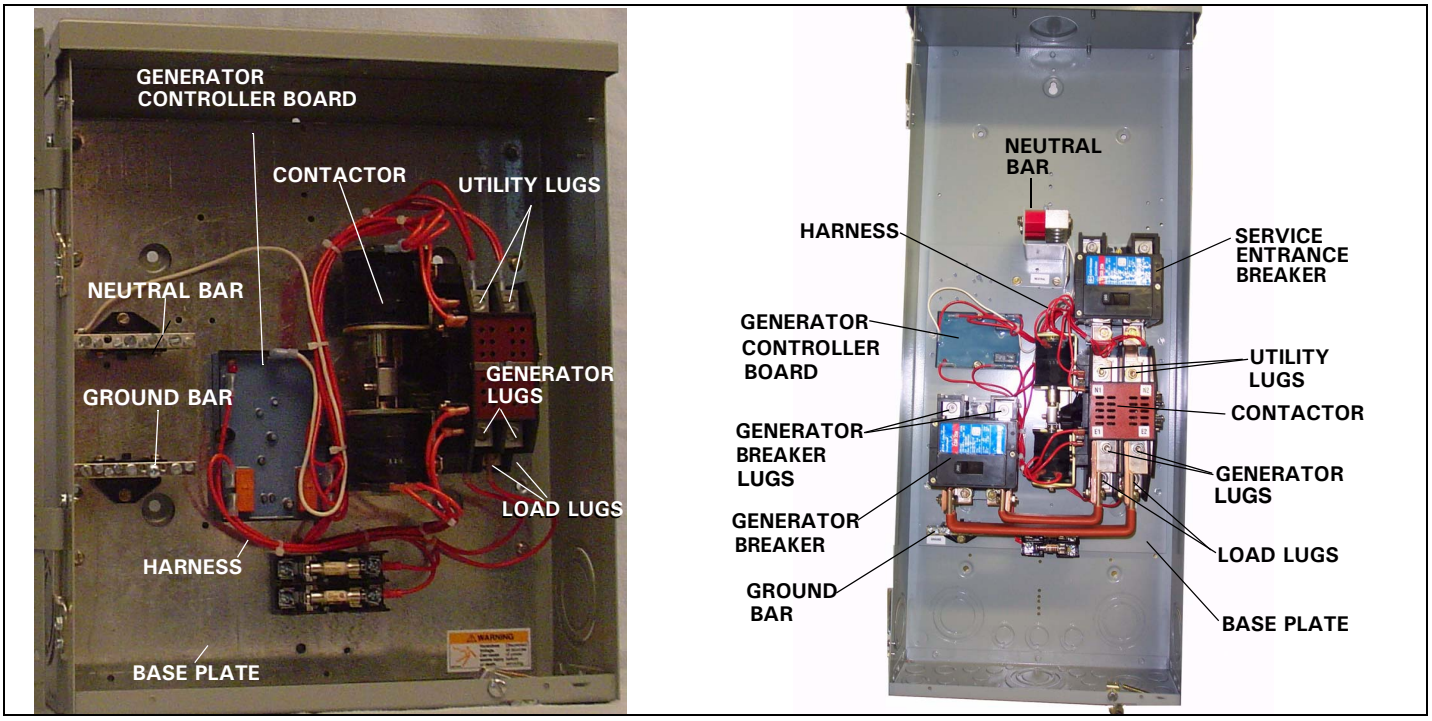


**Figure 21. Field Replaceable Components (Left 100 A Standard, Right 200 A SE).**

### Table 4. Field Replaceable Components

| COMPONENT | PART NUMBER | ATS MODEL |
|---|---|---|
| Contactor | 8160A99G51 | 100 A |
| Contactor | 8160A99G52 | 200 A |
| Generator Controller Board | 8160A99G33 | 100 & 200 A |
| Ground Bar | 8160A99G55 | 100 & 200 A |
| Load Shed (Option) | 8160A99G36 | 100 & 200 A |
| Lugs | 8160A99G56 | 100 A |
| Lugs | 8160A99G57 | 200 A |
| Neutral Bar | 8160A99G53 | 100 A |
| Neutral Bar | 8160A99G54 | 200 A |
| Service Entrance Breaker | 8160A99G41 | 100 A |
| Service Entrance Breaker | 8160A99G42 | 200 A |
| Service Entrance Cover | 8160A99G45 | 100 & 200 A |
| Service Entrance Lugs | 8160A99G43 | 100A |
| Service Entrance Lugs | 8160A99G44 | 200A |
| Generator Breaker (SE Only Option) | 8160A99G41 | 100A |
| Generator Breaker (SE Only Option) | 8160A99G42 | 200A |
| Generator Breaker Lugs (SE Only Option) | 8160A99G43 | 100A |
| Generator Breaker Lugs (SE Only Option) | 8160A99G44 | 200A |
| SurgTel | 8160A99G48 | 100 & 200 A |
| SurgCable | 8160A99G49 | 100 & 200 A |
| TVSS (Internal, SE Only-Option) | 8160A99G46 | 100 & 200 A |
| TVSS (External, Standard or SE-Option) | 8160A99G47 | 100 & 200 A |
| Wiring Harness1 | 8160A99G34 | 100 & 200 A |

**Note:** 1 When replacing the wiring harness on the 100 A ATS, the flag must be cut off the one white wire and replaced with the appropriate size ring terminal.

**⚠ WARNING**

**HIGH VOLTAGES ARE PRESENT IN AND AROUND TRANSFER SWITCH EQUIPMENT. BEFORE ATTEMPTING TO REPLACE ANY COMPONENT, DISCONNECT THE LINE POWER FROM THE EQUIPMENT BEING SERVICED BY OPENING AND LOCKING OUT, IF POSSIBLE, THE NEXT HIGHEST DISCONNECT DEVICE. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE SEVERE PERSONAL INJURY AND/OR DEATH.**

**ALWAYS TURN THE UTILITY (SOURCE 1) POWER OFF AND TURN THE GENERATOR (SOURCE 2) CONTROL SELECTOR SWITCH TO THE "OFF" POSITION BEFORE ATTEMPTING TO REPLACE ANY COMPONENTS.**

**NOTICE**

**APPLY UTILITY (SOURCE 1) POWER AND PLACE THE GENERATOR CONTROL SELECTOR SWITCH IN THE "AUTO" POSITION AFTER THE COMPONENT HAS BEEN REPLACED. TEST THE SYSTEM FOR PROPER FUNCTIONALITY.**

### 6.4.1 Component Replacement Instructions

#### *6.4.1.1 100 A and 200 A Controller Board*

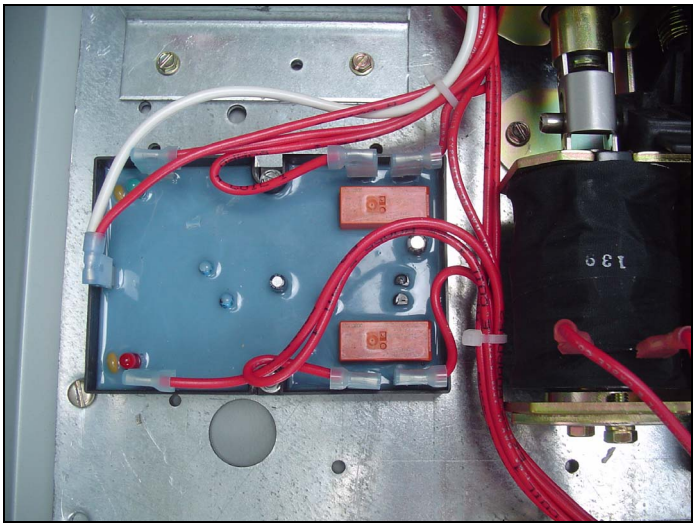

**Figure 22. Generator Controller Board Installed in the CHGEN ATS.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the generator controller board.

**Step 2:** Note the orientation of the generator controller board as it was mounted to the base plate at the factory (see Figures 23 and 24)

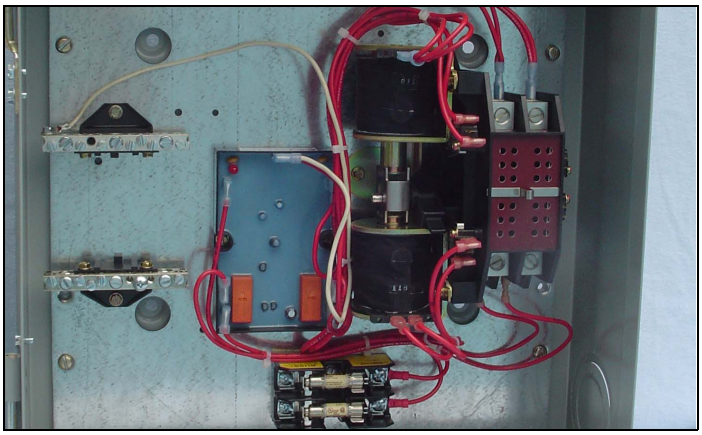

**Figure 23. Generator Controller Board as Mounted in a Standard 100 A CHGEN ATS.**

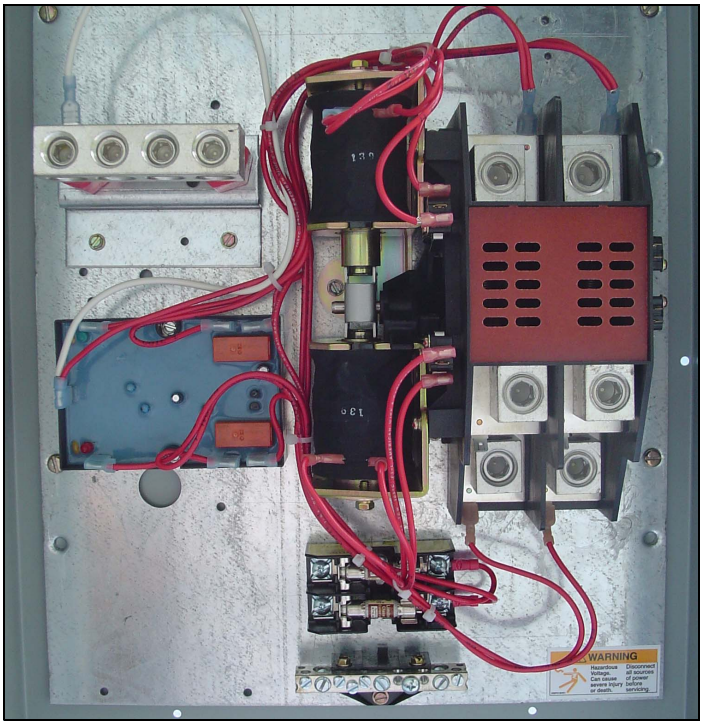

**Figure 24. Generator Controller Board as Mounted in a Standard 200 A, 100 A SE, and 200 A SE CHGEN ATSs.**

**Step 3:** Disconnect the Neutral, N1, 1, N Coil, N Aux. N.C., E Aux. N.C., E Coil, and E2 female flag connectors from the generator controller board (Refer to the wiring diagram in Figure 20 for connection locations on the generator controller board) (see Figure 25).

**Note:** All wires connected to the generator controller board are labeled to ease identification.

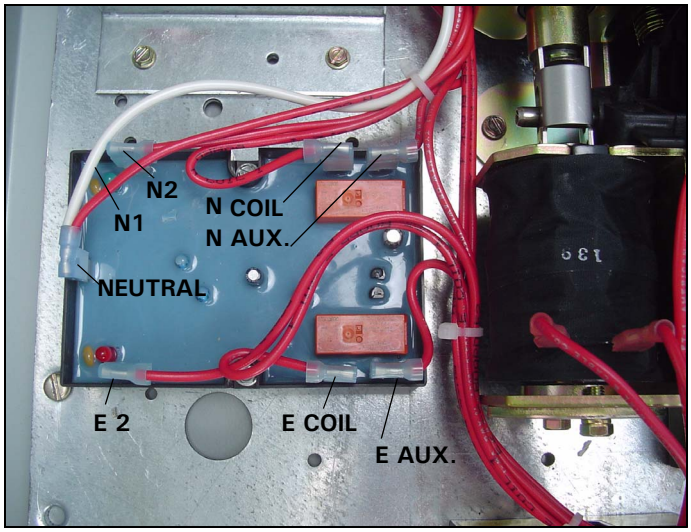


**Figure 25. Wires to Disconnect from the Generator Controller Board.**

**Step 4:** Remove the two (2) screws securing the generator controller board to the base plate using a blade screwdriver. Remove the generator controller board.

**Step 5:** Orient the new generator controller board as per the original installation then align the controller board with the existing holes in the base plate. Secure the new generator controller board to the base plate using the hardware supplied (see Figure 23 or 24).

**Step 6:** Connect the Neutral, N1, N2, N Coil, N Aux. N.C., E Aux. N.C., E Coil, and E2 female flag connectors to the new generator controller board (Refer to the wiring diagram in Figure 20 for connection locations on the generator controller board) (see Figure 25).

**Step 7:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the generator controller board has been replaced. Test the system for proper functionality.

### *6.4.1.2 100 A Neutral Bar*

**Note:** The 100 A ground and neutral bars are the same. Refer to Figure 26 for the correct location.

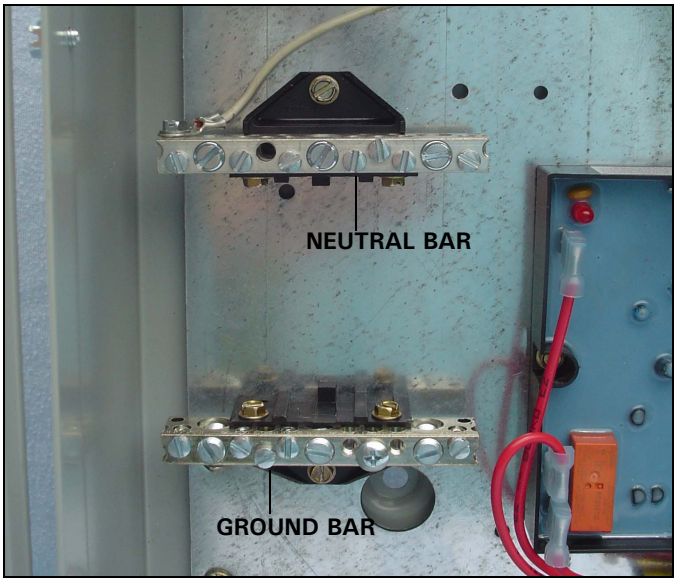


**Figure 26. 100 A Neutral Bar.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the neutral bar.

**Step 2:** Disconnect all wire cables from the neutral bar.

**Step 3:** If the neutral bar has been grounded, remove the 1.5 in. screw that grounds the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).

**Step 4:** Remove the screw in the black base using a blade screwdriver or 0.25 in. socket or nut driver. Remove the neutral bar (see Figure 27).

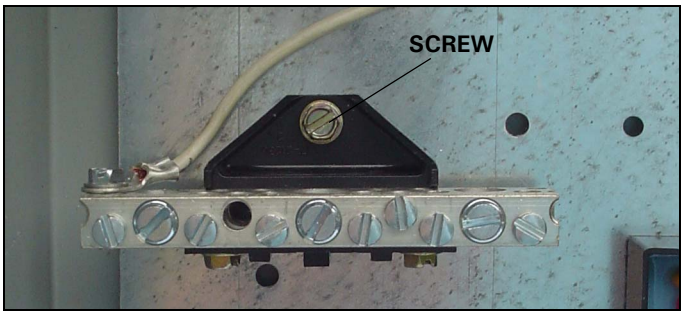


**Figure 27. Replacing the 100 A Neutral Bar.**

**Step 5:** Remove the screw securing the white wire to the neutral bar using a blade screwdriver or 0.25 in. socket or nut driver.

**Step 6:** Attach the white wire to the new neutral bar using the hardware supplied.

**Step 7:** Mount the neutral bar to the base plate using the hardware supplied.

**Step 8:** If the neutral bar being replaced was grounded, use the 1.5 in. screw removed in Step 3 to ground the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).

**Step 9:** Reconnect all wire cables to the neutral bar.

**Step 10:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the neutral bar has been replaced. Test the system for proper functionality.

#### *6.4.1.3 200 A Neutral Bar*

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the SE neutral bar.

**Step 2:** Disconnect all wire cables from the neutral bar.

**Step 3:** Disconnect the flag from the wire terminal on the back of the neutral bar (see Figure 28).

**Step 4:** If the neutral bar has been grounded, remove the 10-32 × 0.625 in. screw that grounds the neutral bar to the base plate. Also remove the 1/4-20 × 0.50 in. bolt securing the copper connector to the bottom of the neutral bar (see Instructional Leaflet supplied with the grounding kit for more information).

**Step 5:** Remove the two (2) screws securing the neutral bar bracket to the base plate (see Figure 28) using a blade screwdriver or 0.25 in. socket or nut driver. Remove the neutral bar.

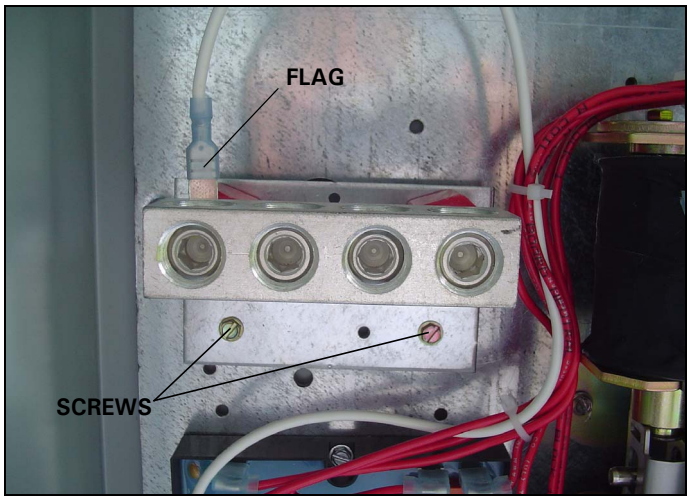


**Figure 28. Replacing the 200 A Neutral Bar.**

**Step 6:** Secure the new neutral bar assembly to the base plate using the hardware supplied.

**Step 7:** If the neutral bar being replaced was grounded, use the copper connector, 10-32 × 0.625 in. screw, and 1/4-20 × 0.50 in. bolt removed in Step 4 to ground the neutral bar to the base plate (see Instruction Leaflet supplied with the grounding kit for more information).

**Step 8:** Connect the flag to the wire terminal on the back of the neutral bar.

**Step 9:** Reconnect all wire cables to the neutral bar.

**Step 10:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the SE neutral bar has been replaced. Test the system for proper functionality.

#### *6.4.1.4 Ground Bar*

**Note:** The 100 A ground and neutral bars are the same. Refer to Figure 26 for the correct location.

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the ground bar

**Step 2:** Disconnect all wire cables from the ground bar.

**Step 3:** Remove the 1.5 in. long screw at the top of the ground bar (see Figure 29) using a Phillips screwdriver.

**Figure 29. Replacing the Ground Bar.**

**Step 4:** Remove the screw in the black base using a blade screwdriver or 0.25 in. socket or nut driver (see Figure 29). Remove the ground bar.

**Step 5:** Secure the new ground bar to the base plate using the hardware supplied.

**Step 6:** Insert the 1.5 in. long screw into the top of the ground bar. Use the hardware supplied if necessary.

**Step 7:** Reconnect all wire cables to the ground bar.

**Step 8:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the ground bar has been replaced. Test the system for proper functionality.

### *6.4.1.5. Replacing the Contactor*

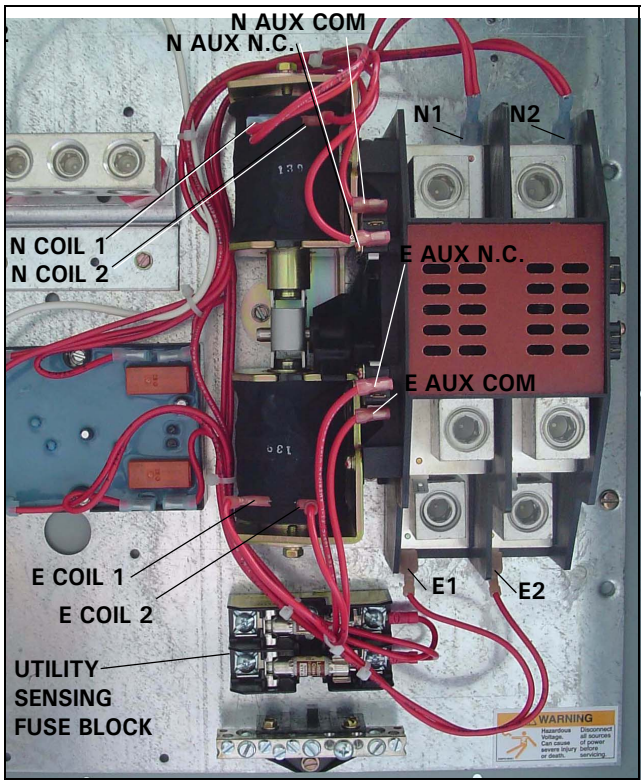


**Figure 30. Replacing the Contactor.**

**Note:** If you are replacing the contactor in a 100A or 200A SE ATS, the service entrance breaker must be removed first. Also jumpers between the generator breaker (inside the ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor must be removed. Follow steps 1 through 4 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 3& 4 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the contactor.

**Step 2:** Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 30).

**Note:** All wires connected to the contactor are labeled to ease identification.

**Step 3:** Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver. Remove the contactor.

**Step 4:** Following the replacement steps for the 100 A or 200 A lugs (see Sections 6.4.1.7 and 6.4.1.8), remove the lugs from the old contactor then install the lugs on the new contactor.

**Step 5:** Secure the contactor onto the base plate using the hardware supplied.

**Step 6:** Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 30 for the correct connection point.

**Step 7:** Reconnect all wire cables to the contactor as per their original connections.

**Note:** If you are replacing the contactor in a 100A or 200A SE ATS, the service entrance breaker must be reinstalled at this time. Also reconnect the jumpers between the generator breaker (inside the ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor. Follow steps 5 through 10 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 8 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 8:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

### *6.4.1.6 Wire Harness*

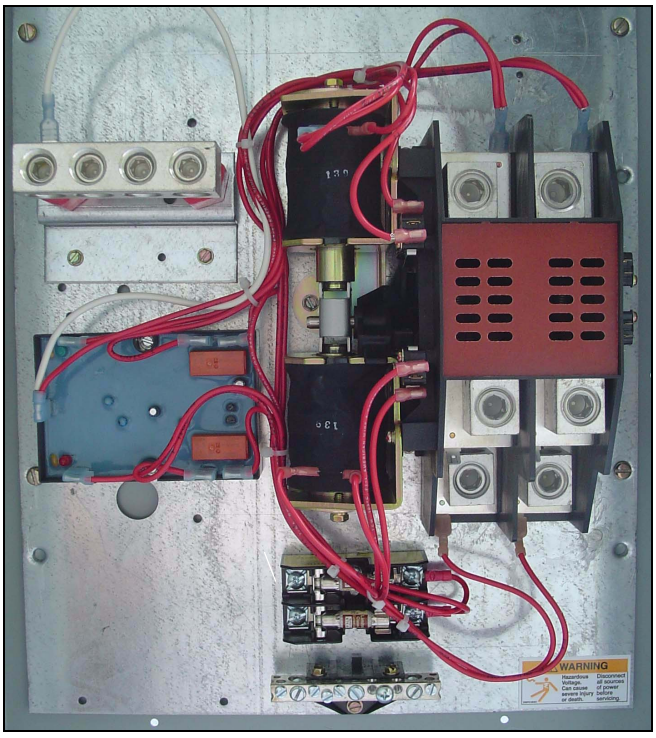


**Figure 31. Replacing the Wire Harness.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the wiring harness.

**Step 2:** Disconnect the installer-connected control wiring from the utility sensing fuse block.

**Step 3:** Remove the Utility sensing fuses from the fuse block to gain access to the fuse block mounting screws (see Figure 32).

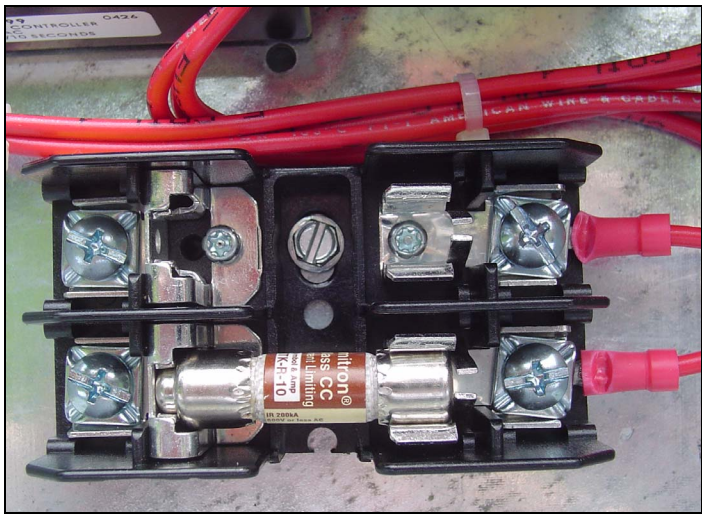

**Figure 32. Remove the Fuses to Access the Mounting Screws.**

**Step 4:** Remove the two (2) screws securing the utility sensing fuse block to the base plate using a blade screwdriver or 0.25 in. nut driver (see Figure 32).

**Step 5:** Note their location then disconnect the twelve (12) red wires from the contactor (Refer to the wiring diagram in Figure 20 for connection locations on the contactor) (see Figure 33).

**Note:** All wires connected to the contactor are labeled to ease identification.

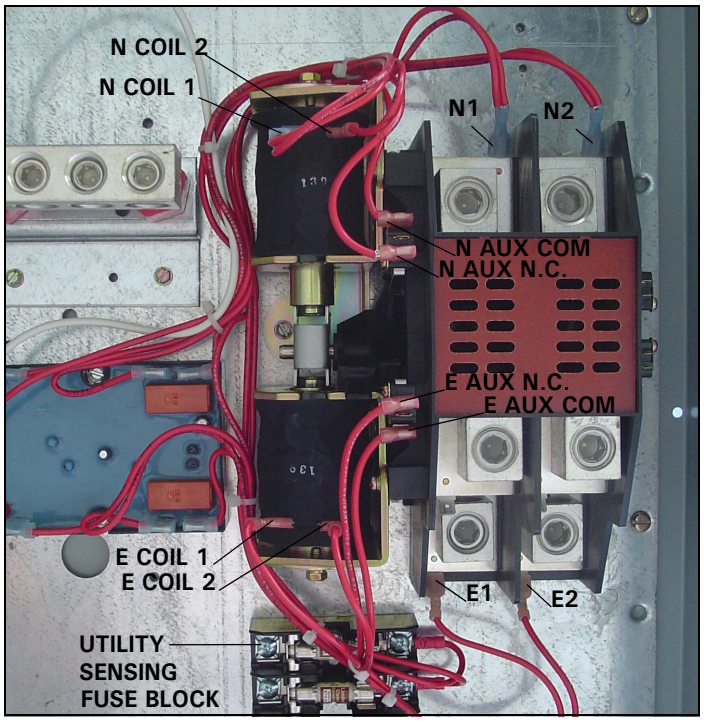


**Figure 33. Wires to Disconnect from the Contactor.**

**Note:** If the load shed option has been installed in the ATS, DO NOT remove the red wire running from the load shed to the auxiliary switch on the right side of the contactor.

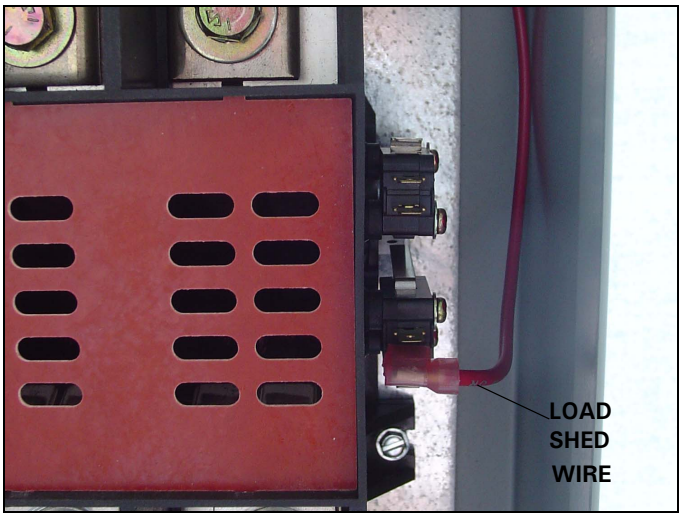


**Figure 34. Optional Load Shed Wire Connected to the Auxiliary Switch on the Contactor.**

**Step 6:** Disconnect the Neutral, N1, N2, N Coil, N Aux. N.C., E Aux. N.C., E Coil, and E2 female connectors from the generator controller board (Refer to the wiring diagram in Figure 20 for connection locations on the generator controller board). (see Figure 35).

**Note:** All wires connected to the generator controller board are labeled to ease identification.

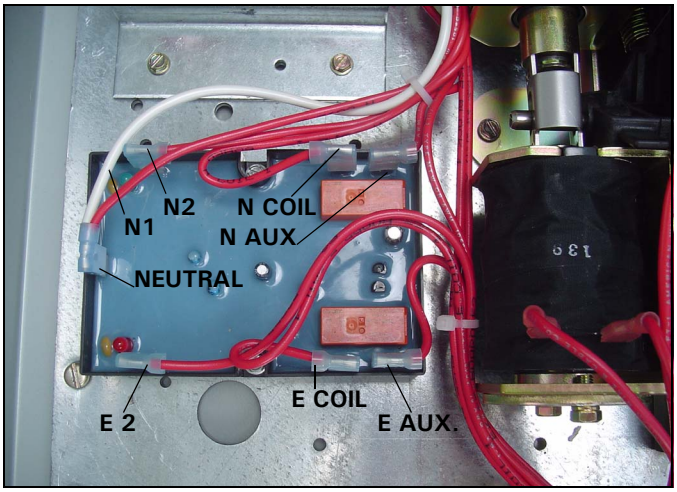


**Figure 35. Wires to Disconnect from the Generator Controller Board.**

**Step 7:** Disconnect the white wire that runs from the generator controller board to the neutral bar. On 100 A ATS, use a blade screwdriver to remove the screw securing the white wire's ring terminal to the neutral bar.

**Note:** If an optional load shed is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire. The red load shed wire will have to be reattached to the neutral bar when the white wire in the new wiring harness is connected to the neutral bar later in this process.

On 200 A standard and SE ATSs, remove the white wire from the flag connector on the neutral bar.

**Note:** If an optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed wire and white TVSS wire to the neutral bar. Cut the red load shed and white TVSS wires as close to the connector as possible. They will be reconnected later in this process (see Figure 36).

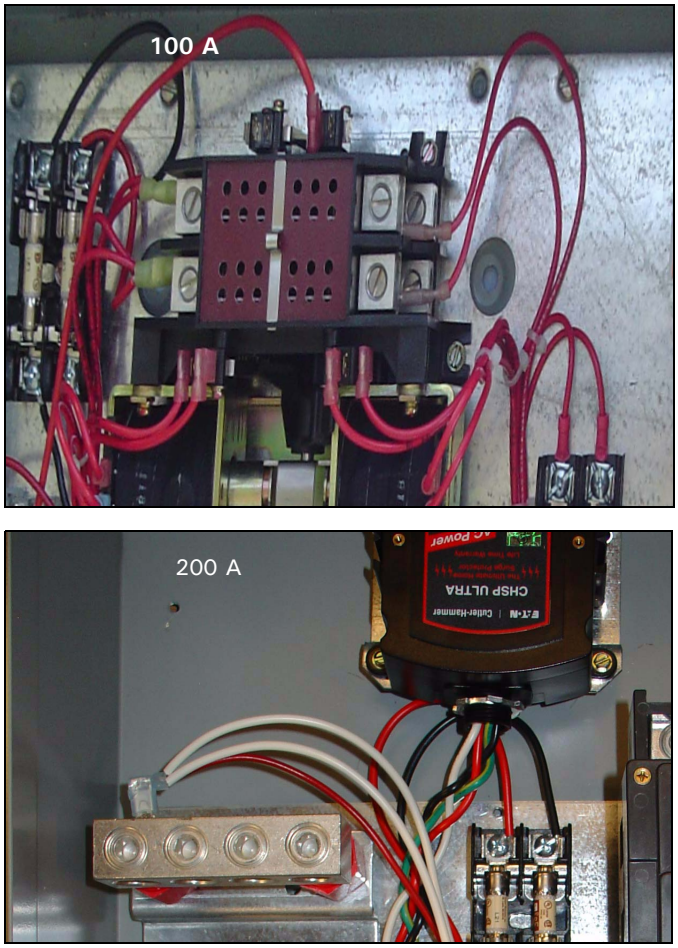


**Figure 36. White Wiring Harness, Optional Red Load Shed, and Optional White TVSS Wires Connected to a 100 A and 200 A Neutral Bars.**

**Step 8:** Remove the original wiring harness, complete with the utility sensing fuse block, from the ATS.

**Step 9:** Place the new wiring harness and utility sensing fuse block in the ATS.

**Step 10:** Connect the white wire to the neutral bar. On 100 A ATS, cut the female flag connector from the white wire. Strip 0.25 in. (6.35 mm) of insulation from the wire then crimp the supplied ring terminal onto the wire. Connect the wire to the neutral bar using a blade screwdriver to tighten the screw.

**Note:** If an optional load shed is installed in the 100 A ATS, the screw securing the white wire to the neutral bar is also used to secure the red load shed wire.

On 200 A standard or SE ATSs, install the white wire female flag connector on the male flag terminal on the neutral bar.

**Note:** If an optional load shed and/or TVSS is installed in a 200 A standard or SE ATS, the female flag connector is also used to connect the red load shed and white TVSS wires to the neutral bar. Cut the female flag connector from the white wiring harness wire. Strip 0.25 in. (6.35 mm) of insulation from the white wiring harness wire, red load shed wire, and white TVSS wire. Crimp the new female flag connector supplied onto the white and red wires then install the female flag connector on the male flag terminal on the neutral bar. (See Figure 36)

**Step 11:** Connect the Neutral, N1, N2, N Coil, N Aux. N.C., E Aux. N.C., E Coil, and E2 female connectors to the generator controller board (Refer to the wiring diagram in Figure 20 for connection locations on the generator controller board (see Figure 35).

**Step 12:** Connect the twelve (12) red wires to the contactor at the locations noted before they were removed (Refer to the wiring diagram in Figure 20 for connection locations on the contactor (see Figure 33).

**Step 13:** Align the utility sensing fuse block with the holes in the base plate from which the original fuse block was removed. Secure the utility sensing fuse block to the base plate using the hardware supplied.

**Step 14:** Install the utility sensing fuses in the fuse block.

**Step 15:** Reconnect the control wiring, removed in Step 2, to the utility sensing fuse block.

**Step 16:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the wiring harness has been replaced. Test the system for proper functionality.

### *6.4.1.7 Replacing the 100 A Lugs*

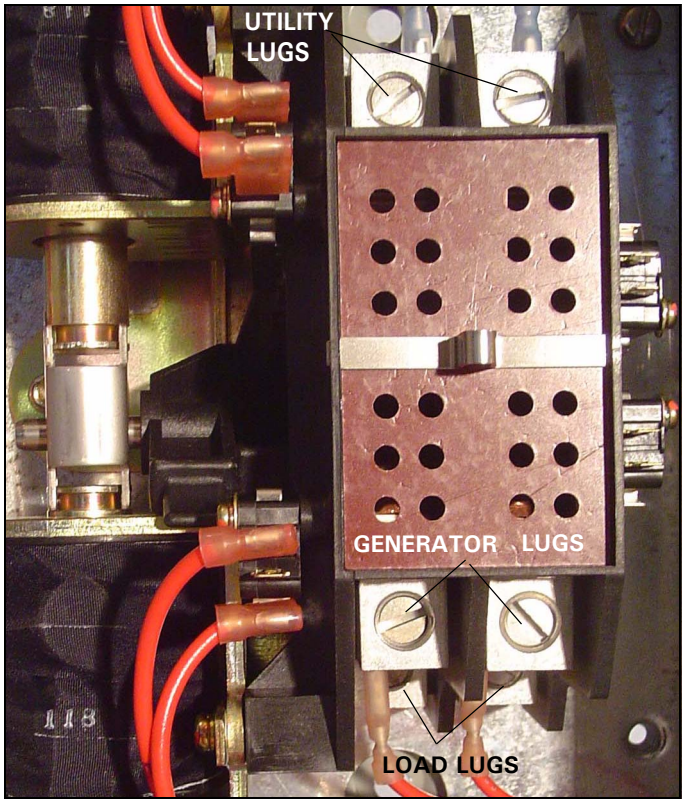


**Figure 37. Replacing the 100 A Lugs.**

**Note:** If you are replacing the lugs in 100A SE ATS, the service entrance breaker must be removed first. Also jumpers between the generator breaker (inside ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor must be removed. Follow steps 1 through 4 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 3& 4 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

**Step 2:** Disconnect all wire cables from the contactor.

**Step 3:** Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 33).

**Note:** All wires connected to the contactor are labeled to ease identification.

For SE ATSs only.

**Step 4:** Remove the hardware securing the utility bus extensions to the contactor and SE Breaker. Remove the utility bus extension.

For All ATSs

**Step 5:** Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver.

**Step 6:** Remove the two (2) generator lugs and the two (2) load lugs using a blade screwdriver (see Figure 37).

For SE ATSs, Skip This Step.

**Step 7:** Once the load lugs have been removed, insert a blade screwdriver up through the circular hole in the load lug bus and remove screws securing the two (2) generator lugs.

For SE switch, skip this step.

**Step 8:** Place the new utility lugs on the utility bus so the anti-turn protrusions fit in the holes. Once the lugs are in place, take one (1) supplied control wire terminal and hold it underneath the bus. Using one (1) screw and one (1) washer supplied, tighten the control wire terminal and lug to the utility bus. Repeat the process of the second utility lug. Ensure that no gaps are present between the lugs and bus.

**Step 9:** Place the new generator lugs on the generator bus. Once the lugs are in place, take one (1) supplied control wire terminal and hold it underneath the bus. Using one (1) screw and one (1) washer supplied, tighten the control wire terminal and lug to the generator bus. Repeat the process of the second generator lug. Ensure that no gaps are present between the lugs and bus.

**Step 10** Secure the load lugs to the load bus using the hardware supplied.

**Note:** The load lugs do not require control wire terminals.

**Step 11:** Secure the contactor to the base plate using the four (4) screws supplied.

For SE ATSs.

**Step 12:** Align the utility lug extension with the SE breaker and contactor. Secure the utility bus extension to the SE breaker and contactor using the original hardware.

**Note:** If you are replacing the lugs in a 100A SE ATS, the service entrance breaker must be reinstalled at this time. Also reconnect the jumpers between the generator breaker (inside the ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor. Follow steps 5 through 10 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 8 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 13:** Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 33 for the correct connection point.

**Step 14:** Reconnect all wire cables to the contactor as per their original connections.

**Step 15:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

### *6.4.1.8 200 A LUGS*

**Figure 38. Replacing the 200 A Lug - Lug Location.**

**Note:** If you are replacing the lugs in 200A SE ATS, the service entrance breaker must be removed first. Also jumpers between the generator breaker (inside the ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor must be removed. Follow steps 1 through 4 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 3 & 4 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

**Step 2:** Disconnect all wire cables from the contactor.

**Step 3:** Note their location then disconnect the twelve (12) red wires from the contactor (see Figure 33).

**Note:** All wires connected to the contactor are labeled to ease identification.

For SE ATSs only.

**Step 4:** Remove the hardware securing the utility bus extensions to the contactor and SE Breaker. Remove the utility bus extension.

For all ATSs.

**Step 5:** Remove the four (4) screws securing the contactor to the base plate using a blade screwdriver or 0.25 in. socket or nut driver.

**Step 6:** Remove the load lugs first by removing the four (4) Phillips screws from the back of the contactor using a Phillips screwdriver. The load bus extension and load lugs can now be removed by sliding it away from the contactor (see Figure 39).

**Step 7:** Remove each load lug from the load bus using a blade screwdriver or 5/16 in. socket or nut driver.

**Step 8:** Next, insert a blade screwdriver or 5/16 in. socket or nut driver up through the load lug terminal hole and remove the hardware securing the two (2) generator lugs (see Figure 39). Remove the generator lugs.

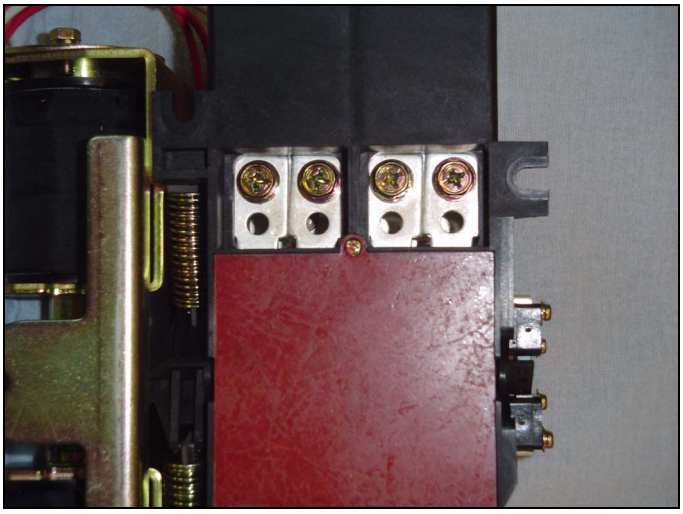

**Figure 39. Replacing the 200 A Lugs.**

For SE Switch, skip this step

**Step 9:** Remove the hardware securing the 2 utility lugs using a blade screwdriver or 5/16 in. socket or nut driver. Remove the utility lugs.

For SE switch, skip this step.

**Step 10:** Place the new utility lugs on the utility bus so the anti-turn protrusions fit in the holes (see Figure 38). Once the lugs are in place, secure them to the utility bus using one (1) screw and one (1) washer supplied. Repeat the process of the second utility lug. Ensure that no gaps are present between the lugs and bus.

**Step 11:** Place the new generator lugs on the generator bus so the anti-turn protrusions fit in the holes (see Figure 38). Once the lugs are in place, secure them to the generator bus using one (1) screw and one (1) washer supplied. Repeat the process of the second generator lug. Ensure that no gaps are present between the lugs and bus.

**Step 12:** Secure each load lug to the detached load bus using one (1) screw and one (1) washer supplied.

**Step 13:** Slide the completed load bus extension back into the contactor and secure each extension using the four (4) Phillips screws (see Figure 39).

For SE switches only.

**Step 14:** Align the utility lug extension with the SE breaker and contactor. Secure the utility bus extension to the SE breaker and contactor using the original hardware.

**Note:** If you are replacing the lugs in a 200A SE ATS, the service entrance breaker must be reinstalled at this time. Also reconnect the jumpers between the generator breaker (inside the ATS) and the E1, E2 terminals on the generator (Source 2) side of the contactor. Follow steps 5 through 10 in Section 6.4.1.9 (for 100A & 200A Service Entrance breaker) and steps 8 in Section 6.4.1.10 (for 100A & 200A generator breaker).

**Step 15:** Secure the contactor to the base plate using the four (4) screws supplied.

**Step 16:** Reattach the twelve (12) red wires to the contactor. Examine each wire to find the name then refer to Figure 33 for the correct connection point.

**Step 17:** Reconnect all wire cables to the contactor as per their original connections.

**Step 18:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

***6.4.1.9 100 A and 200 A Service Entrance Breakers***

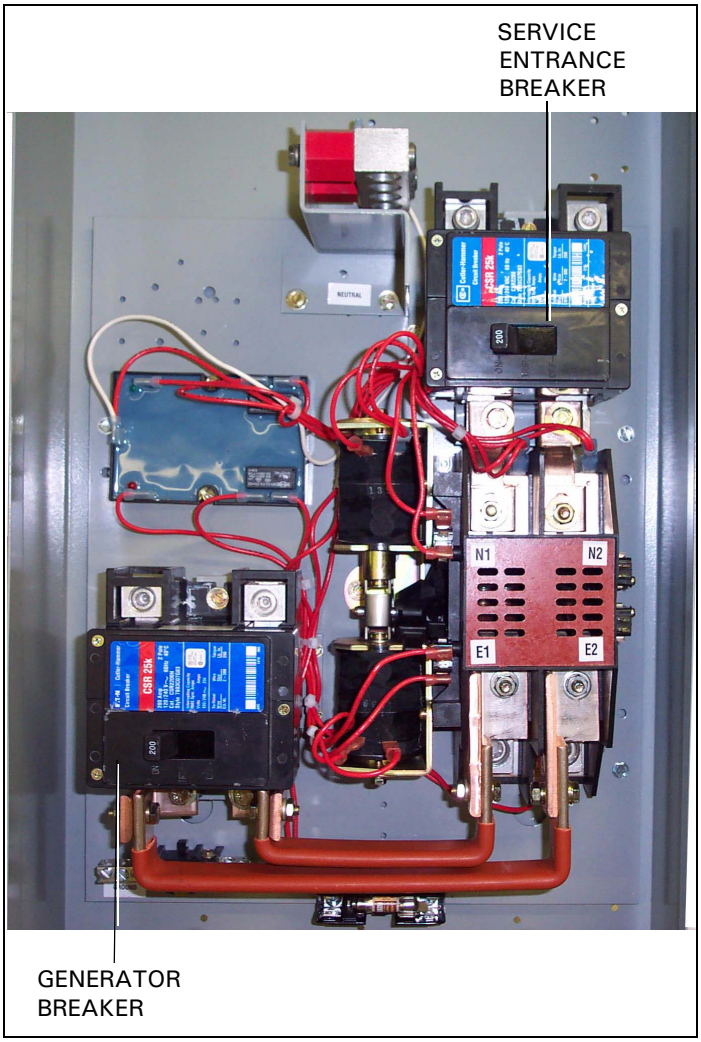


**Figure 40. Service Entrance Breakers Installed (200 A SE ATSs).**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance breaker.

**Step 2:** Disconnect the cables from the lugs on the line side of the service entrance breaker, using a 6mm allen wrench.

**Step 3:** Remove the two (2) bolts, lock washers, and flat washers securing the utility bus extension stabs between the contactor and SE breaker. Using a 7/16 in. wrench, nut driver, or socket and ratchet, remove the utility bus extension stabs (see Figure 41).

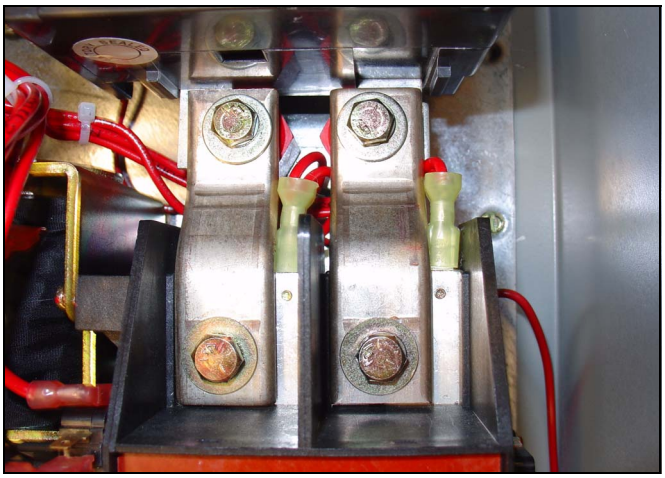

**Figure 41. Stab Connections at the Service Entrance Breaker.**

**Step 4:** Remove the screw securing the top of the service entrance breaker to the mounting bracket using a blade screwdriver or 0.25 in. nut driver. Remove the service entrance breaker from the ATS (see Figure 42).

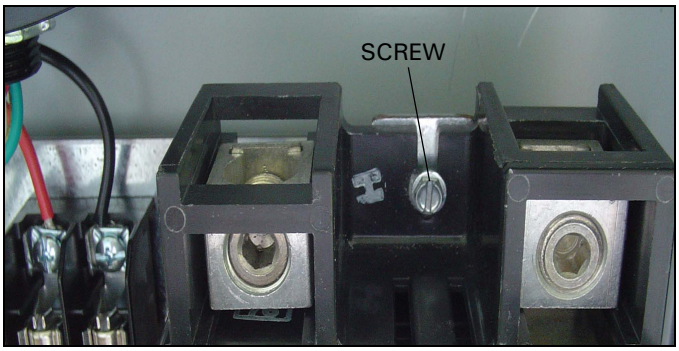


**Figure 42. Location of the Top Service Entrance Breaker Mounting Screw.**

**Step 5:** Align the new service entrance breaker with the holes in the mounting bracket and the contactor bus connections. Note that the stabs of the service entrance breaker should be between mounting bracket red insulating blocks and the contactor bus connections.

**Step 6:** Loosely secure the top of the service entrance breaker to the mounting bracket using the hardware provided (see Figure 42).

**Step 7:** Align the utility lug extension stabs with the SE breaker and contactor. Firmly secure the utility bus extension stabs to the SE Breaker and contactor using original hardware.

**Step 8:** Firmly tighten the screw securing the top of the service entrance breaker to the mounting bracket.

**Step 9:** Reconnect the cables to the line side lugs on the service entrance breaker.

**Step 10:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker has been replaced. Test the system for proper functionality.

### *6.4.1.10 100A and 200A Generator Breakers*

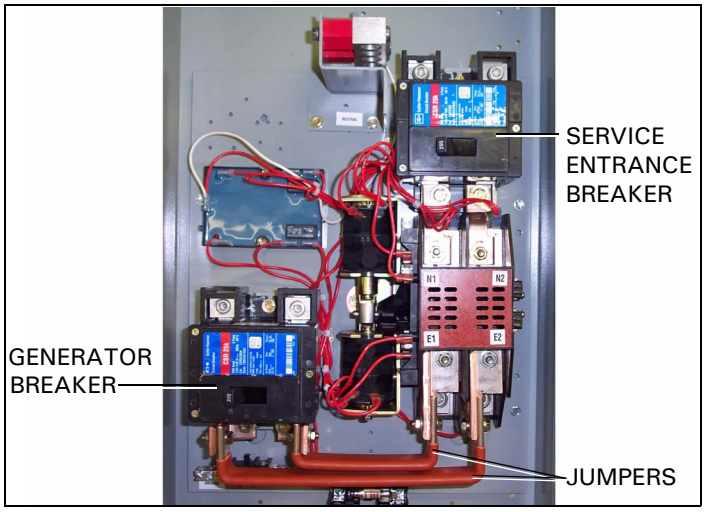


**Figure 43. Generator Breakers Installed (200A SE ATSs).**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to "OFF" position before attempting to replace the generator breaker.

**Step 2:** Disconnect the cables from the lugs on the line side of the generator breaker using 6mm allen wrench.

**Step 3:** Remove the four (4) bolts, lock washers, and flat washers securing the jumpers between the emergency lugs of the contactor and the load lugs of the generator breaker using a 7/16 in. wrench or nut driver. (see Figure – 43 & 44 )

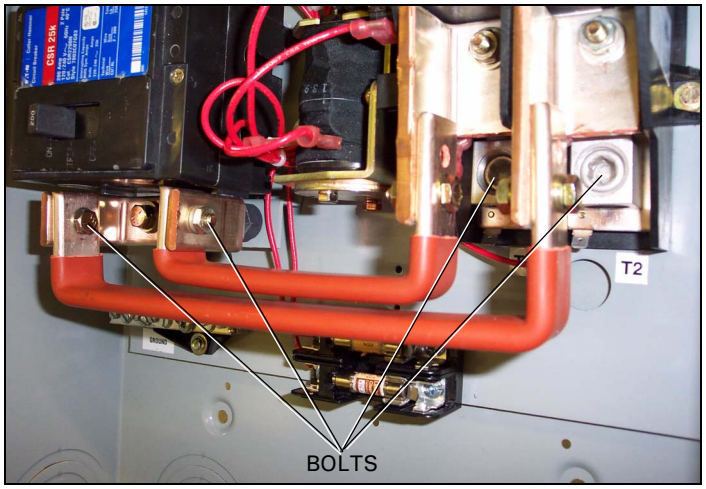


**Figure 44. 200A SE Generator Breaker**

**Step 4:** Disconnect the jumpers between the generator breaker and the lugs at terminals E1 & E2 on the generator (Source 2) side of the contactor.

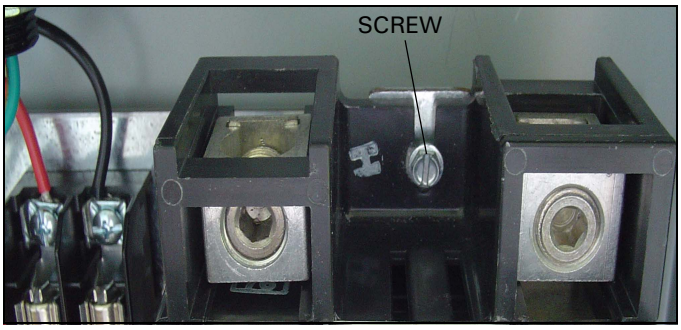


**Figure 45. Location of the Top Generator Breaker Mounting Screw.**

**Step 5:** Remove the screw securing the top of the generator breaker to the mounting bracket using a blade screwdriver or 0.25 in. nut driver. Remove the generator breaker from the ATS (see Figure - 45)

**Step 6:** Align the new generator breaker with the holes in the mounting bracket. Loosely secure the top of the generator breaker to the mounting bracket using the hardware provided.

**Step 7:** Firmly tighten the screw securing the top of the generator breaker to the mounting bracket.

**Step 8:** Reconnect the jumpers between the generator breaker and the lugs at terminals E1 & E2 on the generator (Source 2) side of the contactor using the screws and hardware provided.

**Step 9:** Reconnect the cables to the lugs on the line side of the generator breaker using the lug screws and 6mm allen wrench provided.

**Step 10:** Apply utility (Source 1) power and place the generator selector switch in the "AUTO" position after the generator breaker has been replaced. Test the system for proper functionality.

### *6.4.1.11 Service Entrance Breaker Lugs (100 and 200A)*

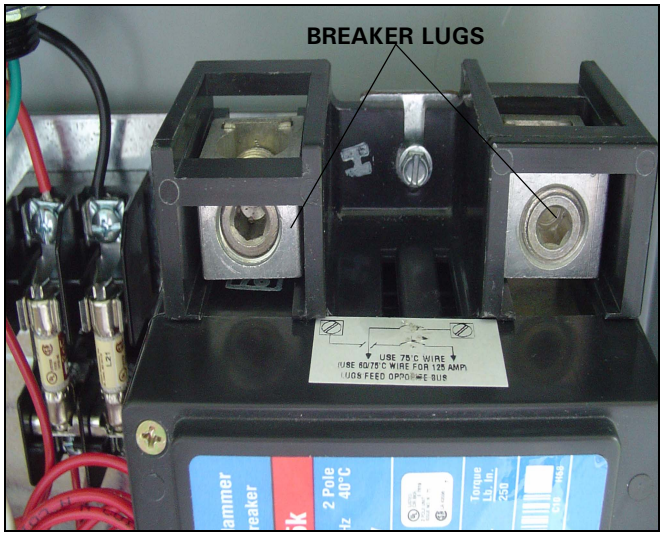


**Figure 46. Location of the Service Entrance Breaker Lugs.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance r breaker's line side lugs.

**Step 2:** Remove the service entrance breaker from the ATS by following steps 1 through 4 in Section 6.4.1.9.

**Step 3:** Working from the rear of the service entrance breaker, remove the two (2) screws securing the lugs to the stabs using a Phillips screwdriver (See fig. 47)

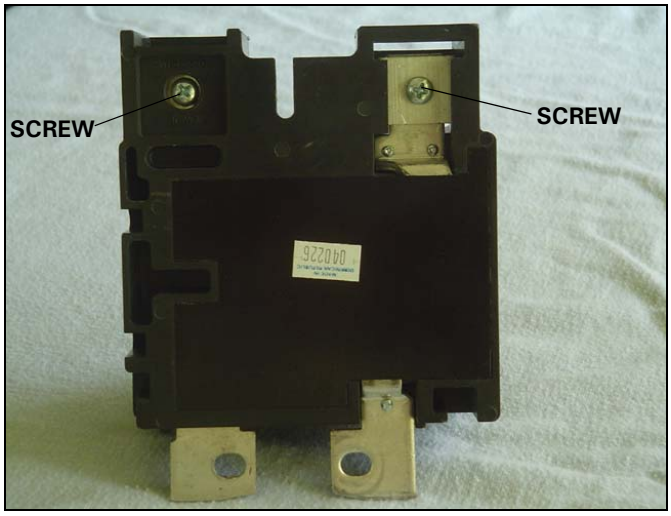


**Figure 47. Location of the Screws Securing the Lugs to the Stabs.**

**Step 4:** Remove the lugs from the stabs.

**Step 5:** Slide the new lugs over the stabs until the holes in each are aligned.

**Step 6:** Secure the new lugs to the stabs using the hardware.

**Step 7:** Reinstall the service entrance breaker in the ATS by following Steps 5 through 10 in Section 6.4.1.9.

**Step 8:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance breaker lugs have been replaced. Test the system for proper functionality.

### *6.4.1.12 Generator Breaker Lugs (100A and 200A)*

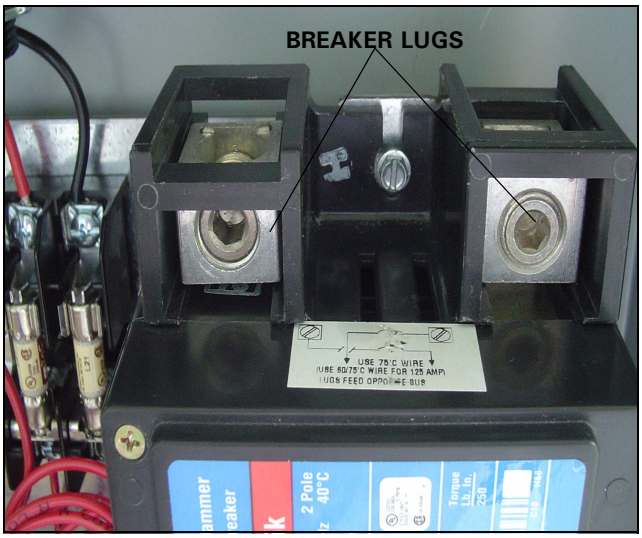


**Figure 48. Location of the Generator Breaker Lugs.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to "OFF" position before attempting to replace the generator breaker's line side lugs.

**Step 2:** Remove the generator breaker from the ATS by following steps 1 through 5 in Section 6.4.1.10.

**Step 3:** Working from the rear of the generator breaker, remove the two (2) screws securing the lugs to the stabs using a Phillips screwdriver (See fig. 49)

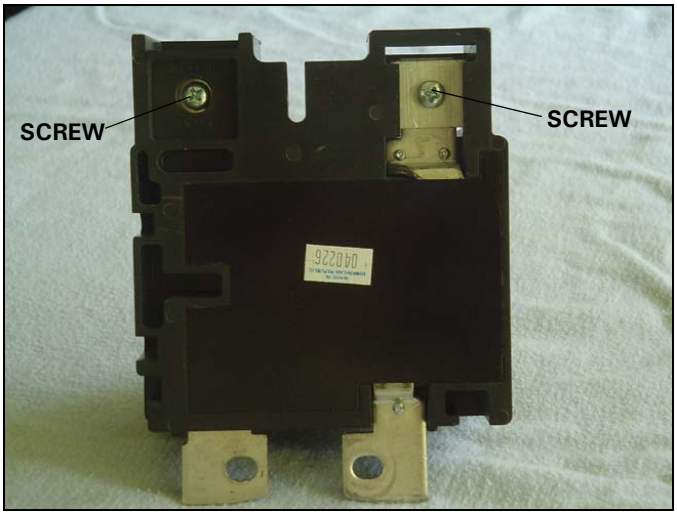


**Figure 49. Location of the Screws Securing the Lugs to the Stabs.**

**Step 4:** Remove the lugs from the stabs.

**Step 5:** Slide the new lugs over the stabs until the holes in each are aligned.

**Step 6:** Secure the new lugs to the stabs using the hardware.

**Step 7:** Reinstall the generator breaker in the ATS by following the steps 6 through 10 in Section 6.4.1.10.

**Step 8:** Apply utility (Source 1) power and place the generator (Source 2) control selector switch in the "AUTO" position after the generator breaker lugs have been replaced. Test the system for proper functionality.

***6.4.1.13 Service Entrance Cover (Service Entrance Breaker and Generator breaker)***

**Figure 50. Service Entrance Cover Installed on the ATS Door.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the service entrance cover.

**Step 2:** Open the service entrance cover door.

**Step 3:** Remove the three (3) screws securing the service entrance cover to the ATS door using a blade screwdriver or 0.25 in. nut driver (see Figure 51). Remove the service entrance cover.

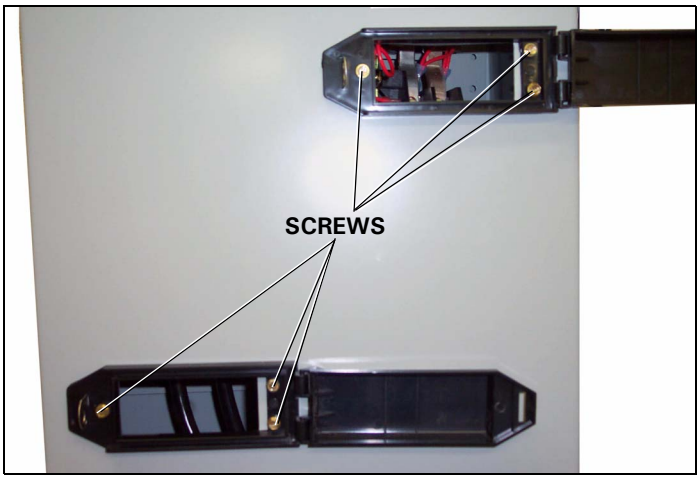


**Figure 51. Location of the Service Entrance Cover Screws.**

**Step 4:** Open the new service entrance cover door and align it with the holes in the ATS door.

**Step 5:** Secure the new service entrance cover to the ATS door using the hardware supplied.

**Step 6:** Close the service entrance cover door.

**Step 7:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the service entrance cover has been replaced. Test the system for proper functionality.

## 6.5 Troubleshooting

Table 5 contains troubleshooting information for the CHGEN ATS. If a problem still exists after completing the troubleshooting procedures, contact an authorized Eaton sales representative.

### Table 5. Troubleshooting Chart

| PROBLEM | CAUSE | CORRECTION |
|---|---|---|
| The automatic transfer switch does not transfer to the generator. | 1. The circuit breaker on the generator is open. | 1. Reset the generator circuit breaker. |
| | 2. The generator voltage is not acceptable. | 2. Refer to the generator User's Manual. |
| | 3. The generator breaker on the ATS unit is open (SE only option) | 3. Turn "ON" the generator breaker on the ATS unit (SE only option) |
| The automatic transfer switch does not transfer to the utility. | 1. The service disconnect breaker is open. | 1. Reset the service disconnect breaker. |
| | 2. The utility voltage is not acceptable. | 2. Wait for the utility voltage to return to normal. |
| The generator is still running after the transfer switch transfers to the utility. | Engine cool down period. | The engine should stop after the cool down period. |

# SECTION 7: INSTALLING OPTIONAL COMPONENTS

## 7.1 Installing the Optional TVSS Externally on a Standard or SE 100 A and 200 A ATS

**Note:** If you are installing a TVSS in a SE ATS, it can be installed internally. See Section 7.2 for detailed installation instructions.

**Note:** Because of the size of the enclosure, if you have either a 100 A or 200 A standard ATS, the TVSS CANNOT be installed inside the enclosure. It will have to be mounted on the outside of the enclosure in a suitable position (see Figure 52).

**Figure 52. Possible Location for and Externally Mounted TVSS.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to install the externally mounted TVSS.

**Step 2:** Determine the desired location for mounting the TVSS. An existing 0.50 in. (1.25 cm) knockout can be used or a 0.50 in. (1.25 cm) hole can be drilled in the enclosure.

**⚠ CAUTION**

**EXTREME CARE SHOULD BE TAKEN TO PROTECT THE ATS FROM DRILL CHIPS, FILINGS, AND OTHER CONTAMINANTS WHEN MAKING THE TVSS MOUNTING HOLE TO PREVENT DAMAGE OR A FUTURE MALFUNCTION**

**⚠ CAUTION**

**TO MEET APPLICABLE CODES, AN EXTERNALLY MOUNTED TVSS MUST BE MOUNTED BELOW THE LEVEL OF THE BOTTOM LUGS (LOAD LUGS) OF THE CONTACTOR.**

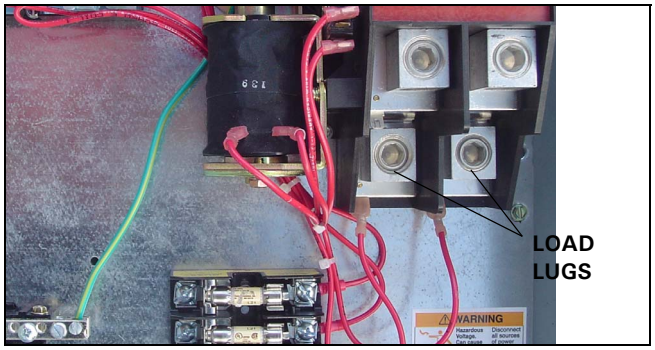


**Figure 53. TVSS Must be Mounted Below the Level of the Load Lugs.**

**Step 3:** Remove the lock nut from the nipple of the TVSS.

**Step 4:** Feed the TVSS wires and mounting nipple through the knockout or hole drilled in the ATS enclosure.

**Step 5:** Secure the TVSS to the ATS enclosure using the lock nut removed in Step 3. Be sure to firmly secure the TVSS using an appropriate tool to fully tighten the lock nut (see Figure 54).

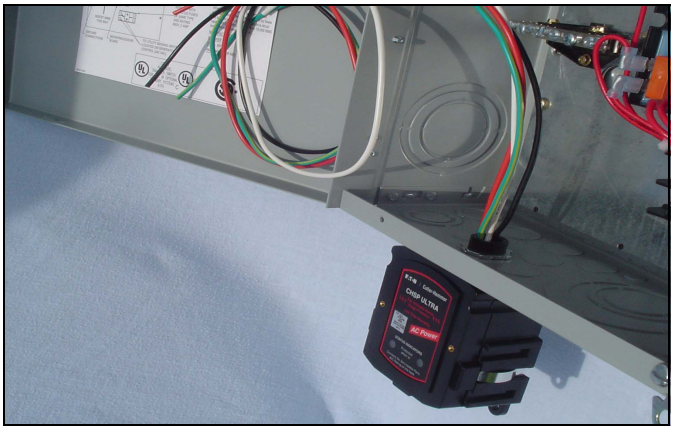

**Figure 54. TVSS Secured to the ATS Enclosure.**

**Note:** The length of the four (4) TVSS wires can affect the performance of the TVSS. During installation, the wires should be kept as short and as close to identical length as possible. In keeping the length of the wires as equal as possible, they should be "braided" to increase the effectiveness of the TVSS.

**Step 6:** Mount the TVSS fuse block to the existing holes on the ATS base plate using the hardware provided. For standard 100 A and 200 A ATSs, the mounting holes are directly above the contactor (see Figure 55).

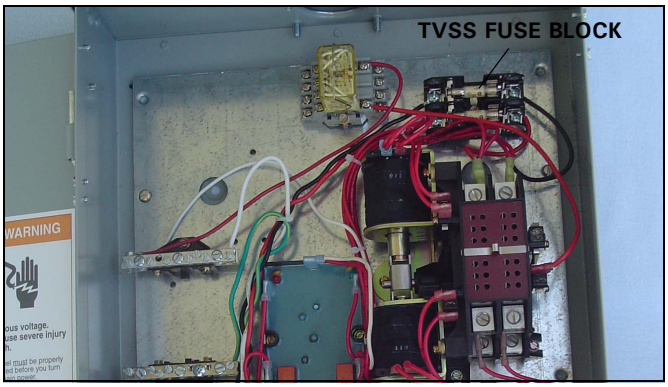


**Figure 55. TVSS Fuse Block Mounted in a Standard ATS.**

**Step 7:** Install the supplied fuses in the TVSS fuse block.

**Step 8:** Based on the following connection points and wire routing, determine which TVSS wire(s) will be the longest.

| WIRE COLOR | CONNECTION POINT |
|---|---|
| Red | TVSS fuse block |
| Black | TVSS fuse block |
| White | ATS neutral bar |
| Green/Yellow | ATS ground bar |

Cut all four (4) wires to the same length necessary to reach the furthest connection point. Braid any excess wire length for the other connection points.

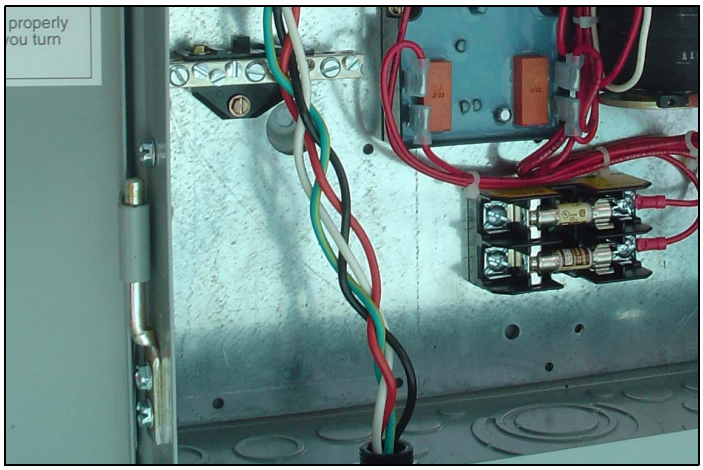


**Figure 56. Braided TVSS Wires.**

**Step 9:** The red and black wires from the TVSS are to be connected to the terminals of the TVSS fuse block. Strip 0.25 in. (6.35 mm) of insulation from the end of the wires.

**Step 10:** Connect the red and black TVSS wires to the TVSS fuse block, using a blade screwdriver (see Figure 57).

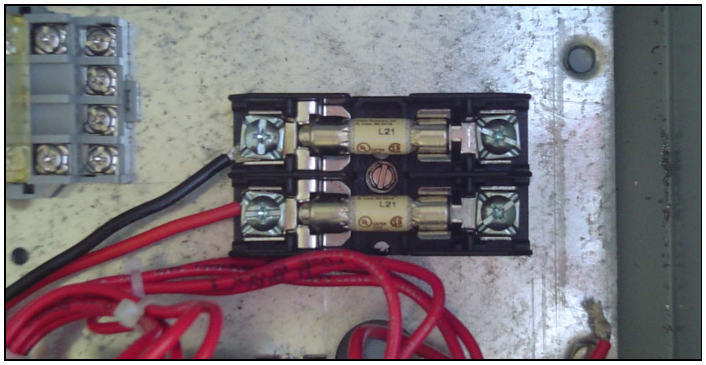

**Figure 57. TVSS Red and Black Wires Connected to the TVSS Fuse Block.**

**Step 11:** The white wire from the TVSS will be connected to the neutral bar. Cut the white wire to a suitable length to connect to the neutral bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

**Step 12:** On 100 A standard ATSs, secure the white TVSS wire to a receptacle on the neutral bar using a blade screwdriver (see Figure 58).

**Note:** On 200 A standard ATSs, the white TVSS wire must be connected to the male flag receptacle on the neutral bar (see Figure 59). Remove the female flag connector from the neutral bar. Cut the female flag connector off of the white wire from the main wiring harness and the red wire from the optional load shed if installed. Strip 0.25 in. (6.35 mm) of insulation from the white TVSS wire, the white wire from the main wiring harness, and red wire from the option load shed if installed. Crimp the supplied female flag connector on the wires so they can be connected to the male flag terminal on the neutral bar.

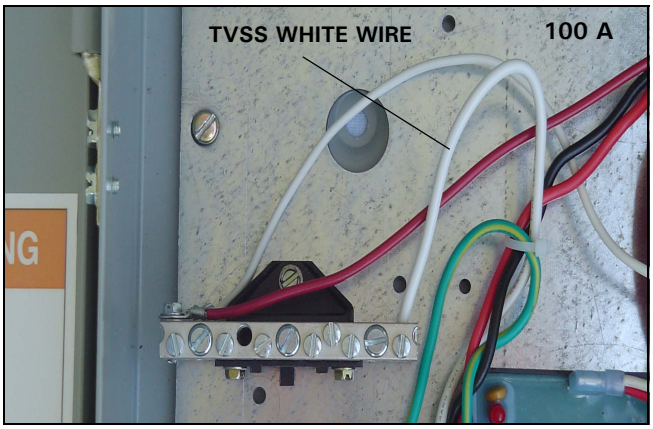


**Figure 58. TVSS White Wire Connected to the 100 A Neutral Bar.**

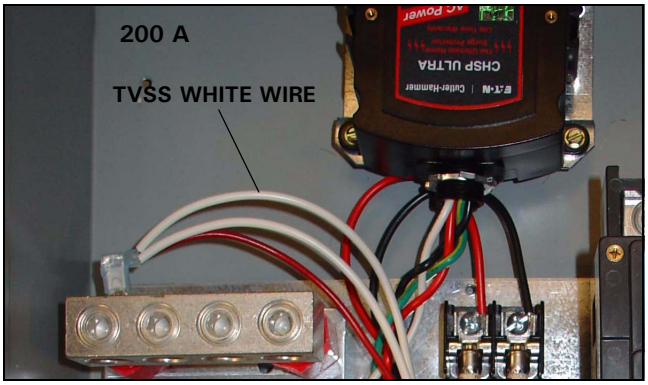


**Figure 59. TVSS White Wire Connected to the 200 A Neutral Bar.**

**Step 13:** The green / yellow wire from the TVS will be connected to the ground bar. Cut the green / yellow wire to a suitable length to connect to the ground bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

**Step 14:** Secure the green / yellow TVSS wire to a receptacle on the ground bar using a blade screwdriver (see Figure 60).

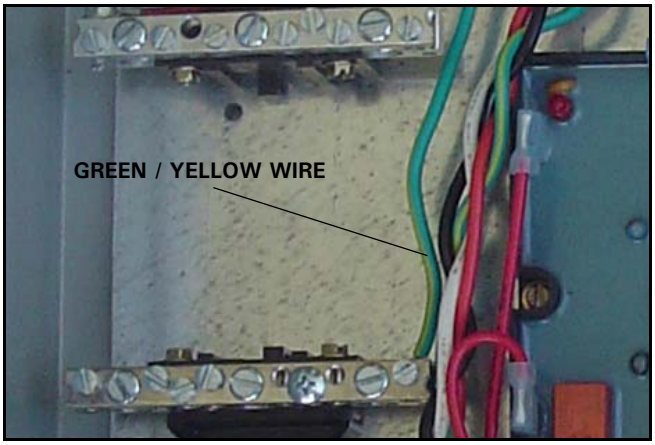


**Figure 60. TVSS Green / Yellow Wire Connected to the Ground Bar.**

**Step 15:** Using the wires cut from the red and black TVSS wires in Step 7 (if long enough), or 600 V 14 AWG wire, make two (2) wire leads that will run from the TVSS fuse block to the male spade connectors at the utility lugs on the contactor.

**Step 16:** Remove the wiring harness connections at the male flag terminal at the N-1 utility lug. Remove the crimp on female flag connector. Strip 0.25 in. (6.35 mm) of insulation from the end of the TVSS wire and the N-1 harness wires. Using the new crimp-on female flag connector supplied, connect the N-1 harness wires with one of the TVSS leads (see Figure 61).

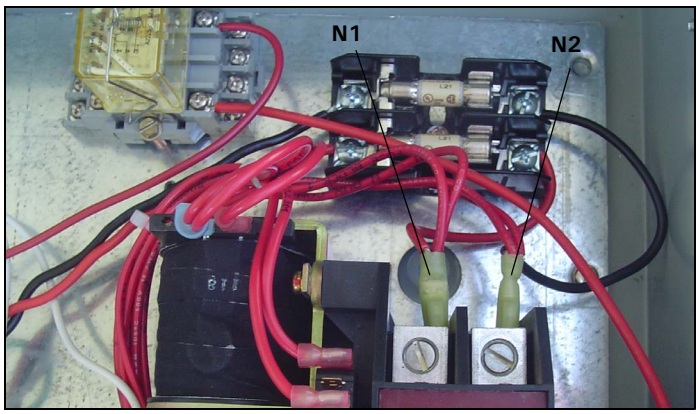


**Figure 61. Connection Points at the TVSS Fuse Block and Utility Lugs.**

**Step 17:** Repeat the process for the N-2 wires.

**Step 18:** Reconnect the N-1 and N-2 female flag connectors to the N-1 and N-2 male flag terminals at the utility lugs.

**Step 19:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the externally mounted TVSS has been installed. Test the system for proper functionality.

## 7.2 Installing the TVSS Internally in a SE 100 A and 200 A ATS

**Note:** Even though there is ample room and existing mounting holes within an SE CHGEN ATS to install an optional TVSS, it can also be mounted externally on the ATS. If you want to externally mount the TVSS, follow the instructions in Section 7.1.

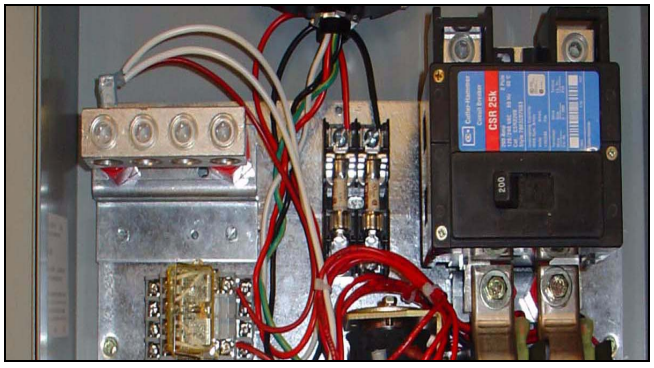

**Figure 62. TVSS Installed Inside an SE ATS.**

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to replace the TVSS.

**Step 2:** Align the TVSS Mounting bracket with the existing holes in the back of the enclosure, located above the base plate. Secure the mounting bracket to the enclosure using the hardware provided and a flat blade screwdriver (see Figure 63).

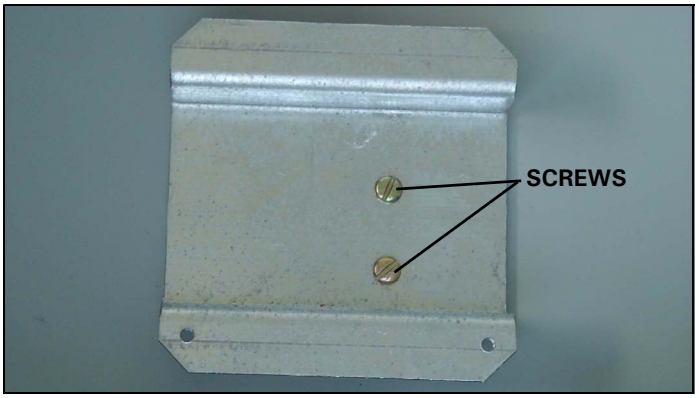


**Figure 63. TVSS Mounting Bracket Secured to the Back of the Enclosure.**

**Step 3:** Align the TVSS with the holes in the mounting bracket. Secure the TVSS to the mounting brackets using the hardware provided and a flat blade screwdriver or 0.25 in. nut driver. Note that the TVSS wires should facing the ATS base plate and installed components (see Figure 64).

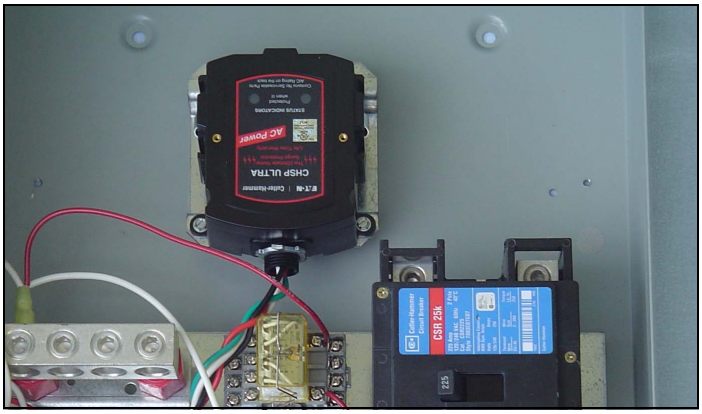

**Figure 64. TVSS Installed on the Mounting Bracket.**

**Step 4:** Mount the TVSS fuse block to the existing holes on the ATS base plate using the hardware provided. For 100 A and 200 A SE ATSs, the holes are directly to the left of the contactor.

**Step 5:** Install the supplied fuses in the TVSS fuse block (see Figure 65).

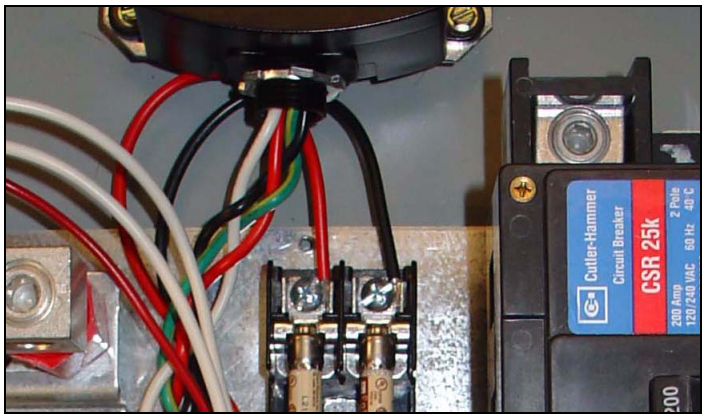


**Figure 65. TVSS Fuse Block Mounted in a SE ATSs.**

**Note:** The length of the four (4) TVSS wires can affect the performance of the TVSS. During installation, the wires should be kept as short and as close to identical length as possible. In keeping the length of the wires as equal as possible, they should be "braided" to increase the effectiveness of the TVSS.

**Step 6:** Based on the following connection points and wire routing, determine which TVSS wire(s) will be the longest.

| WIRE COLOR | CONNECTION POINT |
|---|---|
| Red | TVSS fuse block |
| Black | TVSS fuse block |
| White | ATS neutral bar |
| Green/Yellow | ATS ground bar |

Cut all four (4) wires to the same length necessary to reach the furthest connection point. Braid any excess wire length for the other connection points.

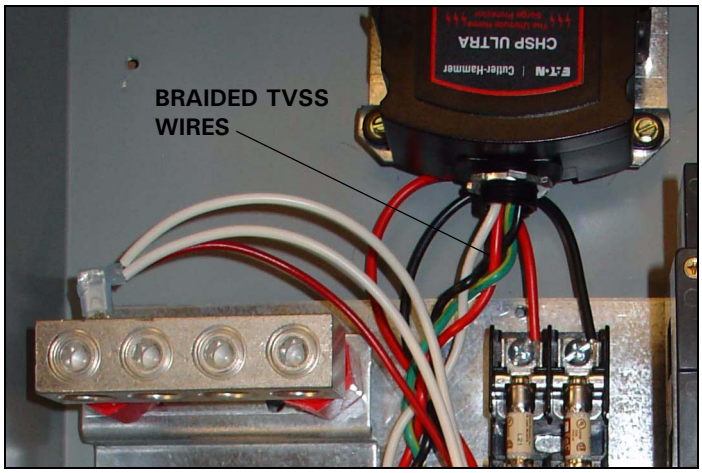


**Figure 66. Braided TVSS Wires.**

**Step 7:** The red and black wires from the TVSS are to be connected to the terminals of the TVSS fuse block. Strip 0.25 in. (6.35 mm) of insulation from the end of the wires.

**Step 8:** Connect the red and black TVSS wires to the TVSS fuse block, as shown, using a blade screwdriver (see Figure 67).

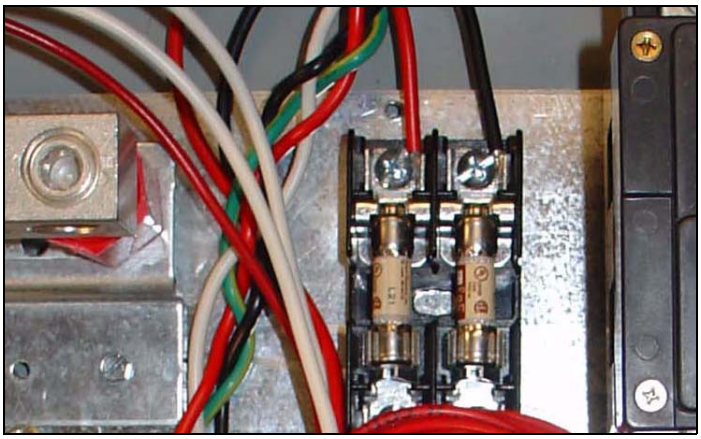

**Figure 67. TVSS Red and Black Wires Connected to the TVSS Fuse Block.**

**Step 9:** The white wire from the TVSS will be connected to the neutral bar. Cut the white wire to a suitable length to connect to the neutral bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

**Step 10:** On 100 A SE ATSs, secure the white TVSS wire to a receptacle on the neutral bar using a blade screwdriver (see Figure 68).

**Note:** On 200 A SE ATSs, the white TVSS wire must be connected to the male flag receptacle on the neutral bar. Remove the female flag connector from the neutral bar. Cut the female flag connector off of the white wire from the main wiring harness and the red wire from the optional load shed if installed. Strip 0.25 in. (6.35 mm) of insulation from the white TVSS wire, the white wire from the main wiring harness, and red wire from the optional load shed if installed. Crimp the supplied female flag connector on the wires so they can be connected to the male flag terminal on the neutral bar (see Figure 69).

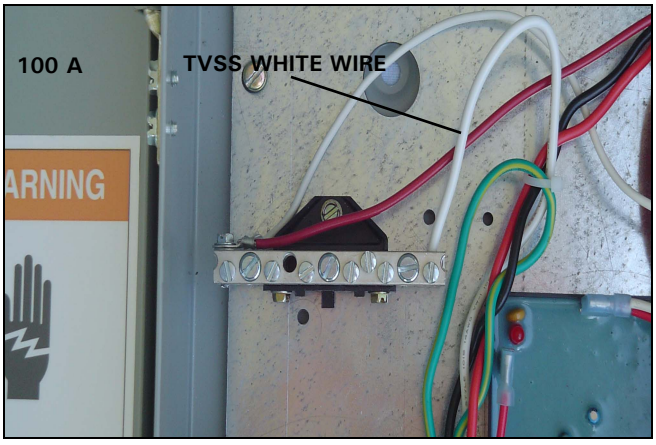


**Figure 68. TVSS White Wire Connected to the 100 A Neutral Bar.**

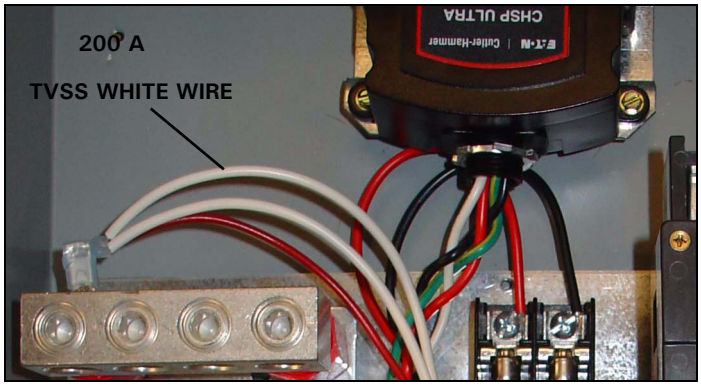


**Figure 69. TVSS White Wire Connected to the 200 A Neutral Bar.**

**Step 11:** The green / yellow wire from the TVS will be connected to the ground bar. Cut the green / yellow wire to a suitable length to connect to the ground bar then strip 0.25 in. (6.35 mm) of insulation from the end of the wire.

**Step 12:** Secure the green / yellow TVSS wire to a receptacle on the ground bar using a blade screwdriver (see Figure 70).

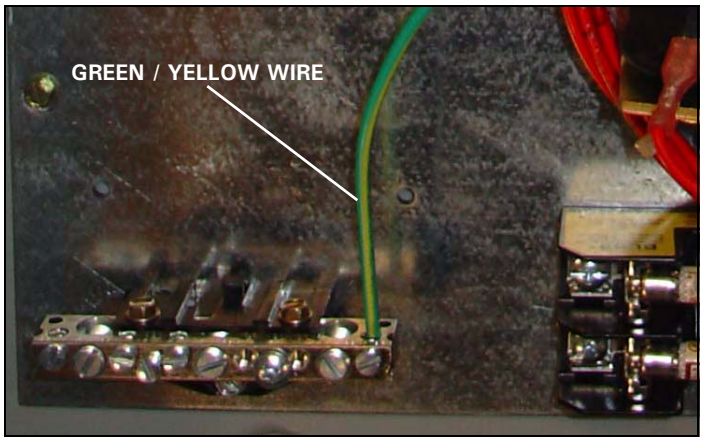


**Figure 70. TVSS Green / Yellow Wire Connected to the Ground Bar.**

**Step 13:** Using the wires cut from the red and black TVSS wires in Step 7 (if long enough), or 600 V 14 AWG wire, make two (2) wire leads that will run from the TVSS fuse block to the male spade connectors at the utility lugs on the contactor (see Figure 71).

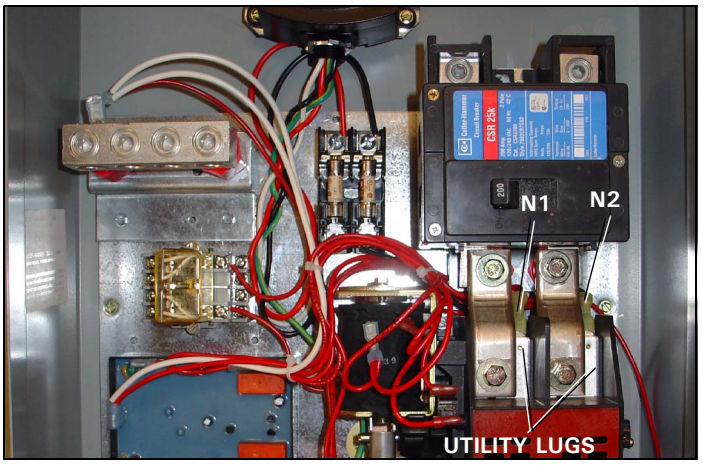


**Figure 71. Connection Points at the TVSS Fuse Block and Utility Lugs.**

**Step 14:** Remove the wiring harness connections at the male flag terminal at the N-1 utility lug. Remove the crimp on female flag connector. Strip 0.25 in. (6.35 mm) of insulation from the end of the TVSS wire and the N-1 harness wires. Using the new crimp-on female flag connector supplied, connect the N-1 harness wires with one of the TVSS leads (see Figure 71).

**Step 15:** Repeat the process for the N-2 wires.

**Step 16:** Reconnect the N-1 and N-2 female flag connectors to the N-1 and N-2 male flag terminals at the utility lugs.

**Step 17:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the internally mounted TVSS has been installed. Test the system for proper functionality.

## 7.3 SurgeTel Installation

**Note:** The Eaton SurgeTel is designed to mount directly to the TVSS when it is externally mounted to the ATS enclosure (see Figure 72). If the TVSS was installed inside the 100 A or 200 A SE ATS enclosure, the SurgeTel MUST BE mounted outside the enclosure (see Figure 73). See the Instruction Bulletin supplied with the SurgeTel for additional information.

**Figure 72. SurgeTel Installed on the Externally Mounted TVSS.**

**Figure 73. SurgeTel Mounted Externally When the TVSS Is Internally Mounted in a SE ATS.**

### 7.3.1 Attaching the SurgeTel to an Externally Mounted TVSS

**Step 1:** Align the quick connector with the receptacle on the right side, left side, or bottom of the TVSS. Slide the SurgeTel into the receptacle until completely seated (see Figure 74).

**Note:** If the SurgeTel will be mounted to the TVSS, no ground wire is required between the SurgeTel and ATS. The TVSS ground will also ground the SurgeTel.

**Note:** The SurgeTel can also be mounted to other Eaton surge protection devices that incorporate the quick connect feature.

**Figure 74. SurgeTel Mounted to the TVSS.**

### 7.3.2 Mounting the SurgeTel with an Internally Mounted TVSS

**Figure 75. SurgeTel Installed Separate from the TVSS.**

**Step 1:** Remove the screw in the middle of the back of the new SurgeTel using a Phillips head screwdriver. Attach the auxiliary ground terminal strip provided to the back of the SurgeTel using the Phillips head screw just removed (see Figure 76).

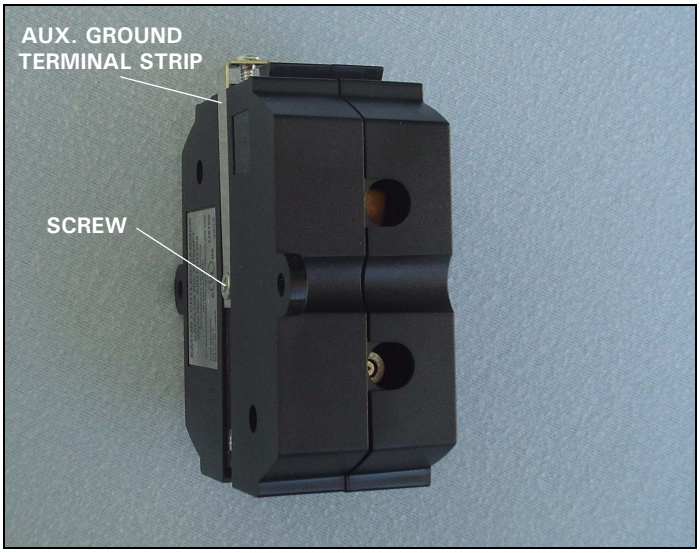


**Figure 76. Auxiliary Ground Strip Mounted to the SurgeTel.**

**Step 2:** Secure the SurgeTel to an acceptable mounting surface near the ATS using the screws supplied.

**Step 3:** Connect the supplied ground wire to the auxiliary ground strip using the screw provided.

**Step 4:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to connect the ground wire to the ATS.

**Step 5:** Route the ground wire into the ATS to the ground bar. Secure the ground TVSS wire to a receptacle on the ground bar using a blade screwdriver.

**Step 6:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position.

### 7.3.3 Connecting the Phone Lines to the SurgeTel

**Step 1:** Route the telephone service wire(s) to the SurgeTel.

**Step 2:** Remove the cover from the SurgeTel.

**Step 3:** Connect the telephone service wires to the SurgeTel connectors.

**Note:** See the Instruction Bulletin supplied with the SurgeTel for complete telephone wire connection information.

**Step 4:** Check for a dial tone on a telephone connected to the system.

**Step 5:** Place and outgoing call and have someone call you back to ensure that the system is working.

## 7.4 SurgeCable Installation

**Note:** The Eaton SurgeCable is designed to mount directly to the TVSS when it is externally mounted to the ATS enclosure (see Figure 77). If the TVSS was installed inside the 100 A or 200 A SE ATS enclosure, the SurgeTel MUST BE mounted outside the enclosure (see Figure 78). See the Instruction Bulletin supplied with the SurgeTel for additional information.

**Figure 77. SurgeCable Installed on the Externally Mounted TVSS.**

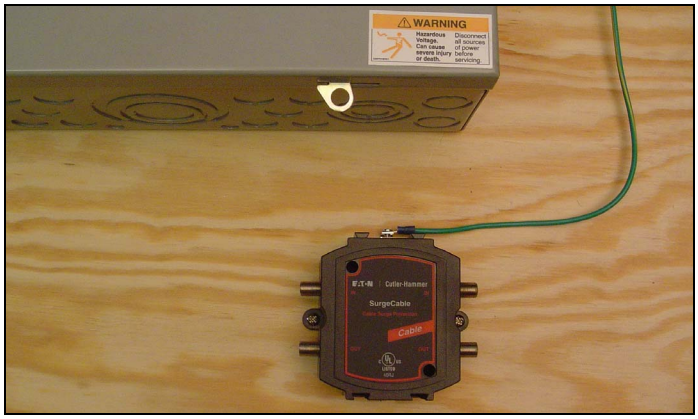


**Figure 78. SurgeCable Mounted Externally When the TVSS Is Internally Mounted in a SE ATS.**

### 7.4.1 Attaching the SurgeCable to an Externally Mounted TVSS

**Step 1:** Align the quick connector with the receptacle on the right side, left side, or bottom of the TVSS. Slide the SurgeCable into the receptacle until completely seated (see Figure 79).

**Note:** If the SurgeCable will be mounted to the TVSS, no ground wire is required between the SurgeCable and ATS. The TVSS ground will also ground the SurgeCable.

**Note:** The SurgeCable can also be mounted to other Eaton surge protection devices that incorporate the quick connect feature.

**Figure 79. SurgeCable Mounted to the TVSS.**

### 7.4.2 Mounting the SurgeCable with an Internally Mounted TVSS

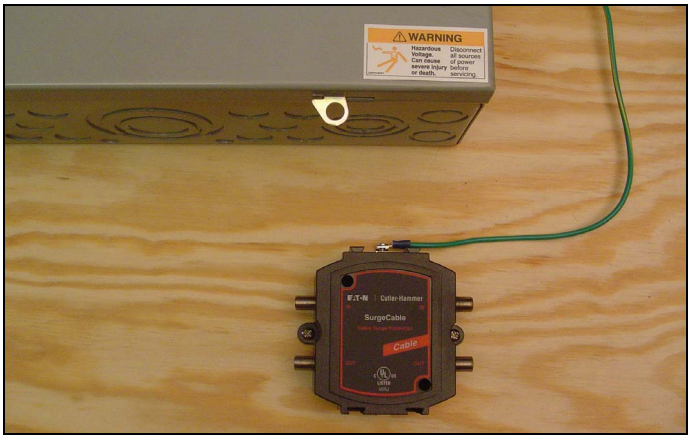


**Figure 80. SurgeCable Installed Separate from the TVSS.**

**Step 1:** Remove the screw in the middle of the back of the new SurgeCable using a Phillips head screwdriver. Attach the auxiliary ground terminal strip provided to the back of the SurgeCable using the Phillips head screw just removed (see Figure 81).

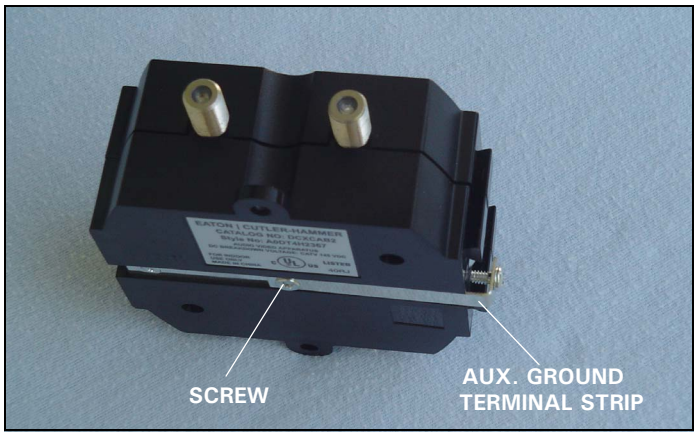


**Figure 81. Auxiliary Ground Strip Mounted to the SurgeCable.**

**Step 2:** Secure the SurgeCable to an acceptable mounting surface near the ATS using the screws supplied.

**Step 3:** Connect the supplied ground wire to the auxiliary ground strip using the screw provided.

**Step 4:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to connect the ground wire to the ATS.

**Step 5:** Route the ground wire into the ATS to the ground bar. Secure the ground TVSS wire to a receptacle on the ground bar using a blade screwdriver.

**Step 6:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position.

### 7.4.3 Connecting the Cables to the SurgeCable

**Step 1:** Reroute the coaxial cables to the SurgeCable.

**Step 2:** Connect the coaxial cables to the applicable "In" and "Out" terminals on the SurgeCable.

**Note:** See the Instruction Bulletin supplied with the SurgeCable for additional connection information.

**Step 3:** After ensuring that all connections are tight, turn on the protected equipment and check for proper functioning.

## 7.5 Installing a Load Shed in a 100 A or 200 A CHGEN ATS

The steps detailed in this section explain how to install a load shed in a 100 A or 200 A CHGEN ATS.

**Step 1:** Turn the utility (Source 1) power off and turn the generator (Source 2) control selector switch to the "OFF" position before attempting to install the load shed.Align the load shed with the existing holes near the top of the base plate, directly above the contactor, for standard ATSs (see Figure 82), and directly below the neutral bar for SE ATSs (see Figure 83). Secure the load shed to the base plate using the hardware supplied.

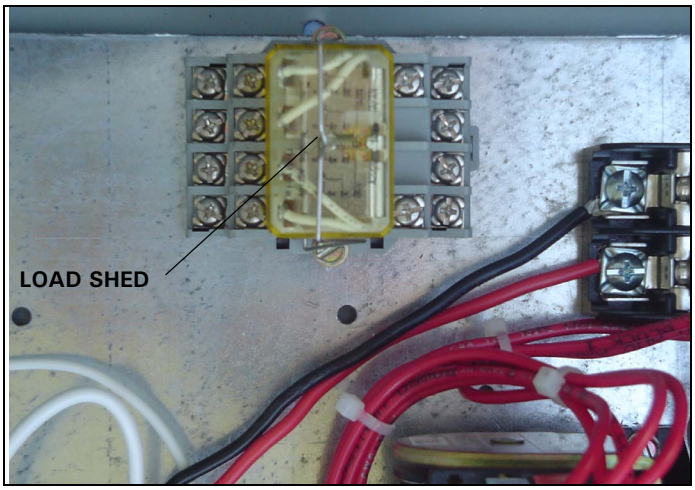


**Figure 82. Load Shed Installed on the Base Plate of a Standard ATS**

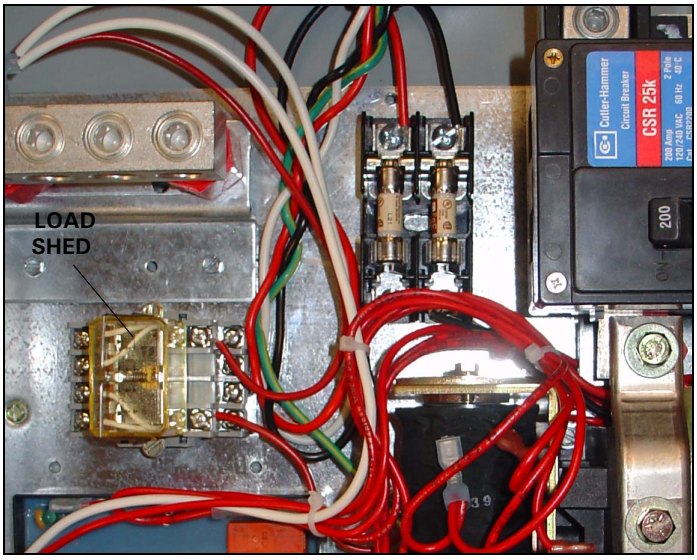


**Figure 83. Load Shed Installed on the Base Plate of an SE ATS.**

**Step 2:** Connect one of the supplied wires to terminal # 14 on the load shed (see Figure 84). Route the wire from the load shed to the neutral bar. On 100 A ATSs, cut the wire to the proper length, strip 0.25 in. (6.35 mm) of insulation from the end of the wire, then crimp the supplied ring terminal onto the wire. Using a blade screwdriver, remove the screw securing the white wire of the main wiring harness to the neutral bar. Align the ring terminal of the white wire with the load shed wire ring terminal and secure both to the neutral bar using the screw just removed (see Figure 85). Refer to the wiring diagram in Figure 20 for connection locations for the load shed wires.

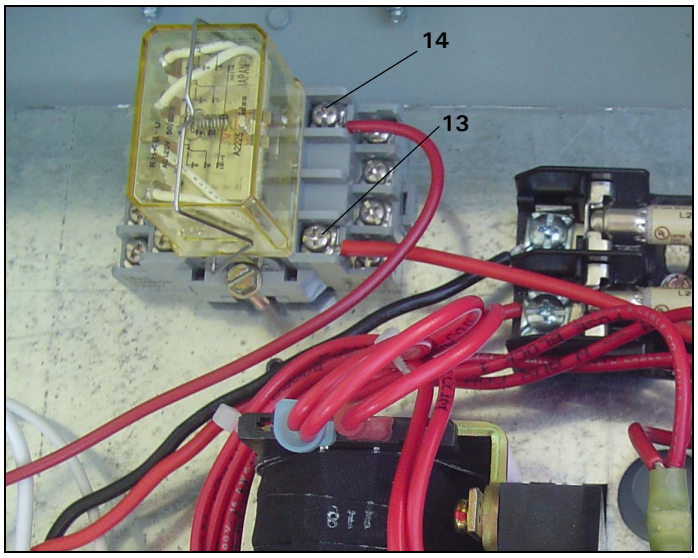


**Figure 84. Main Wire Connections at the Load Shed.**

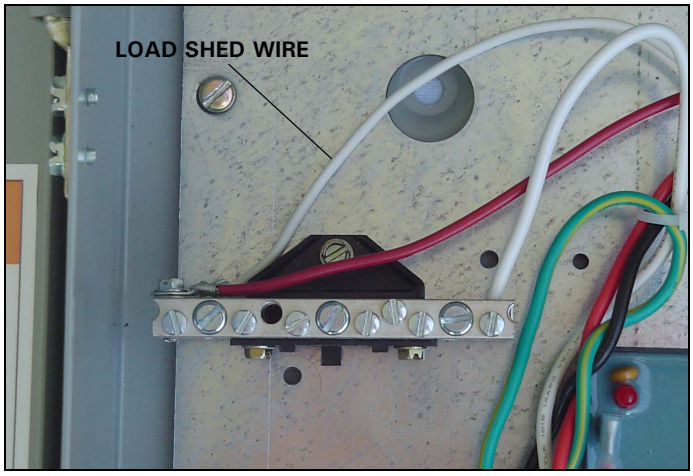


**Figure 85. Load Shed Wire Connected to the Neutral Bar (100 A ATS).**

On 200 A ATSs, remove the female flag connector from the male flag terminal on the neutral bar. Cut the female flag connector from the white wire in the main wiring harness and the white wire from the optional TVSS if installed. Cut the load shed wire to the proper length. Strip 0.25 in. (6.35 mm) of insulation from the end of each of the wires, then crimp the supplied larger female flag connector onto the wires. Connect the female flag connector to the male flag terminal on the neutral bar (see Figure 86). Refer to the wiring diagram in Figure 20 for connection locations for the load shed wires.

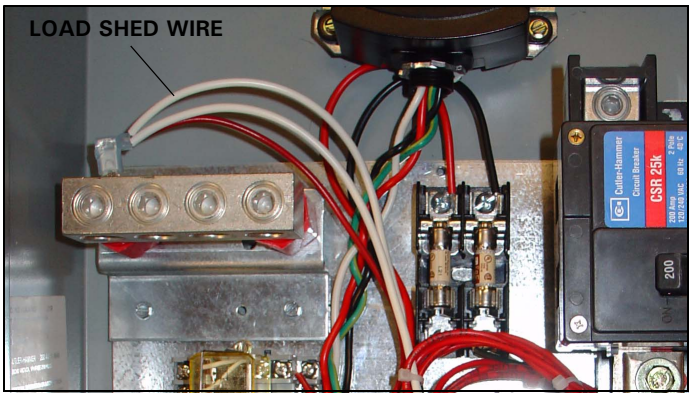


**Figure 86. Load Shed Wire Connected to the Neutral Bar (200 A ATS).**

**Step 3:** Connect one of the supplied wires to terminal # 13 on the load shed (see Figure 84). Route the wire from the load shed to the auxiliary switch on the right side of the contactor. Cut the wire to the proper length and strip 0.25 in. (6.35 mm) of insulation from the end of the wire. Crimp the smaller female flag connector supplied onto the end of the wire. Connect the female flag connector to the male flag terminal on the normally OPEN contact to the auxiliary switch (see Figure 87).

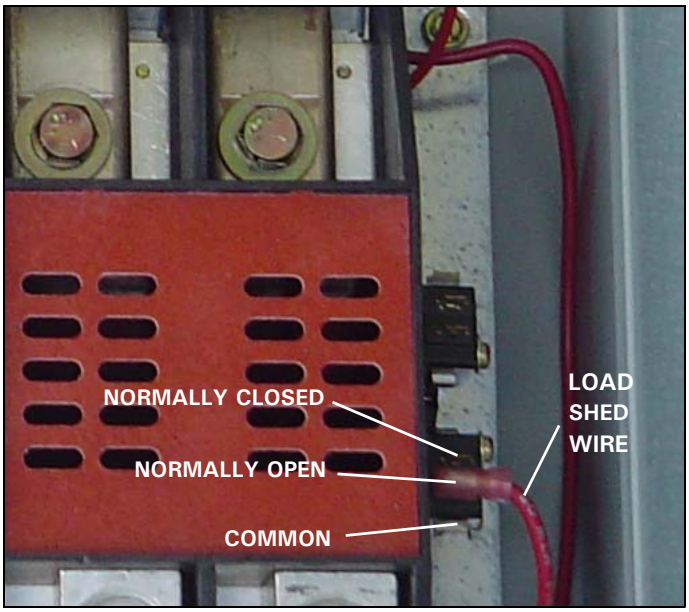


**Figure 87. Load Shed Wire Connected to the Normally OPEN Terminal on the Auxiliary Switch.**

**Step 4:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the load shed has been replaced. Test the system for proper functionality.

**Note:** Terminals 1 through 12 on the load shed provide a number of options for taking advantage of the functionality of the load shed. Refer to Figure 88 for a diagram illustrating the use of these terminals to take advantage of its functionality.

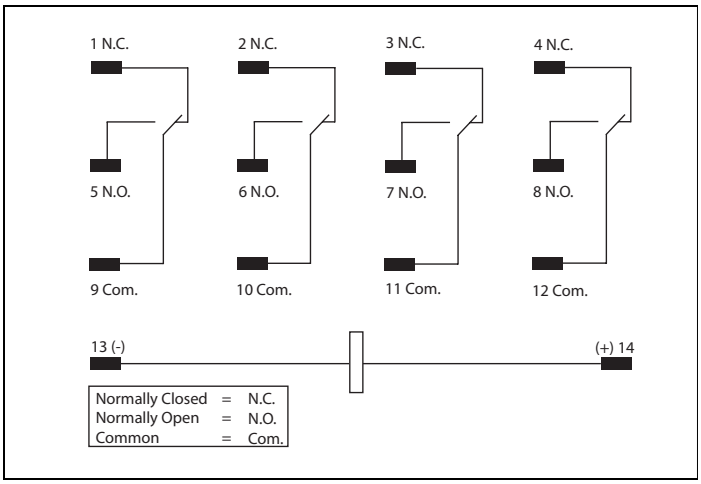


**Figure 88. Additional Connections at the Load Shed.**

**Step 5:** Apply utility (Source 1) power and place the generator control selector switch in the "AUTO" position after the load shed has been replaced. Test the system for proper functionality.

**Notes**

**Notes**

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Printed in USA
Publication No. IB01602014E / TBG00174
January 2008

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